Fall 2005

The Planet, 2005, Fall

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THE PLANET

Fall 2005

CHEMICALS

Dear Reader:

Our everyday lives are soaked in chemicals. From treated wood in telephone poles to the dose in daily medications, society's production and consumption leads to chemical waste.

In this issue of The Planet, we focused on chemicals produced from industrial processes in Whatcom County. We also focused on chemicals used intentionally, like fertilizer, that enter the environment and natural chemicals such as sewage, out of balance in natural systems thanks to human action.

Not all chemicals are hazardous, but most cause harm in excess. Not all companies and industries use outdated methods for production, but most work hard to pump out products for our consumptive desires.

In this issue, we walked a fine line because chemicals are not as inherently evil as the images the word conjures up. A chemical compound is nothing more than any substance composed of identical molecules consisting of atoms of two or more elements. So, in this issue we investigated use, waste and cleanup to see what happens when our excess creates additions to natural cycles.

An ebb and flow exists on this planet that life has influenced and adapted to. The process of production and consumption, however, has not achieved that perfect flow and creates unused waste.

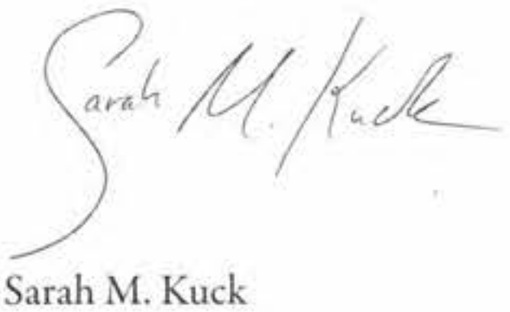
Through research and reporting on this topic it has become even more apparent that we as one species are having great effects on the natural world, from which we are not separate.

David Suzuki once said, "Our choices at all levels—individual, community, corporate and government—affect nature. And they affect us."

We need to have full knowledge of how our choices affect nature. Too often we believe our one single action has no reaction, only noticing once it's too late: once a house explodes, once species start to disappear or once our waters become undrinkable. This issue of The Planet is a small attempt to add to that knowledge because without it we cannot make educated decisions.

I urge you to read and learn all you can from a variety of sources. If you are interested in learning more about chemical disruption, use the back page to find out ways to research or to take action to help mend the human harm so far.

Sincerely,



Sarah M. Kuck

Thanks to: Jeff Hegedus of the Whatcom County Heath Department; April Markiewicz and the Western Washington University Institute of Environmental Toxicology for all their time and knowledge; Randy Trick for his presentation and motivation; Laurie, Dave and Margaret and all the publishing staff.

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Cover Photo by Khale Wallitner
Photo captured on an unidentified water-locked road near the Lummi Flats, west of Lummi Bay.

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The magazine is written, designed and edited by students through Huxley College of the Environment.

Krissy Post

UNNATURAL CAUSES

by Krissy Post
photos courtesy of Brian Klassen

Brian Klassen sat behind an uncluttered desk and talked about fish. Behind him the yellowing aspens were framed in the windows; fall had come to southern British Columbia. Klassen, a fisheries enhancement technician at the Tenderfoot hatchery outside of Squamish, British Columbia, was comfortably dressed in a worn blue sweatsuit. He smiled and slipped out sarcastic jokes in a Canadian accent. The hatchery was between seasons; the fish weren't running, the eggs were in incubation and, in contrast to the pandemonium of recent events, the hatchery had the laidback feel of a firehouse between fires.

On Aug. 5, a Canadian National Railway train was traveling through British Columbia on its way to Prince George, towing 144 cars and more than 13,000 gallons of caustic soda. As the train passed just north of Squamish, nine cars derailed — spilling more than 10,500 gallons of the highly toxic chemical into the Cheakamus River.

This was CN's eighth derailment in two months. The spill immediately killed thousands of fish.

"It's actually better that (the spill) happened when it did," Klassen said. "If it had happened at any other time of the year, more fish would have been in the river and it would have been a disaster."

During the following four days, Klassen led one of the groups that surveyed the area after the spill. In all, the group collected 4,700 dead fish of different species from a 100-meter section of the river.

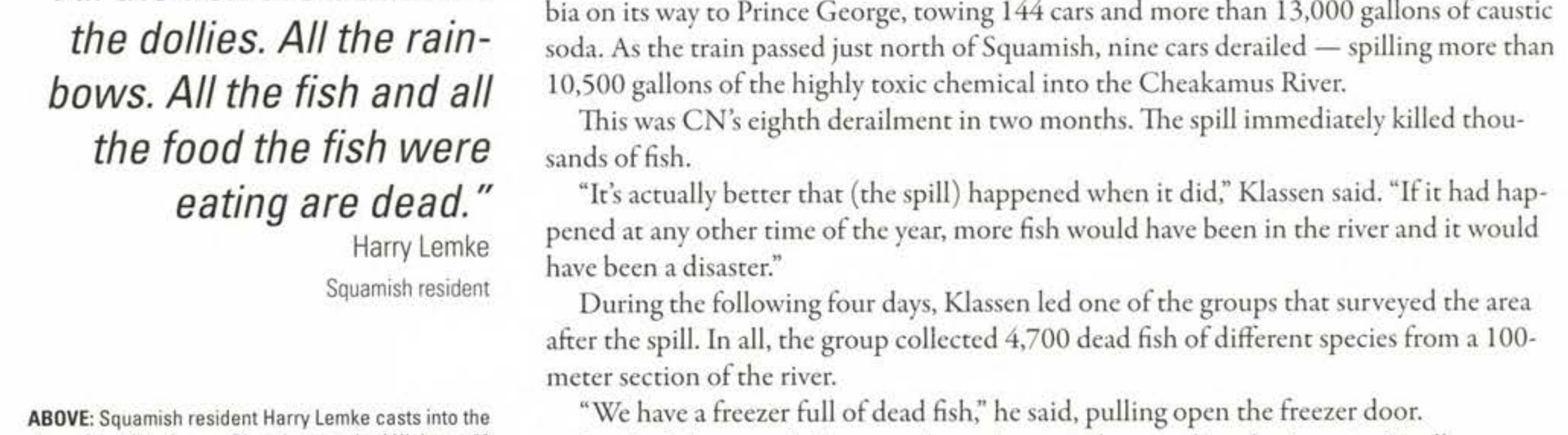
"We have a freezer full of dead fish," he said, pulling open the freezer door.

Inside, fish were piled on wooden palettes and covered in plastic tarps. Smaller specimens lay frozen in buckets on the floor or encased in Ziploc bags stuffed onto metal shelves. He pulled a frozen fish from the pile and held up the weathered-looking 3-foot-long chinook. In another circumstance this could have been an angler holding up a prize catch, but this fish died of a most unnatural cause and now exists only as legal evidence.

"All the fish are dead. All the dollies. All the rainbows. All the fish and all the food the fish were eating are dead."

Harry Lemke
Squamish resident

ABOVE: Squamish resident Harry Lemke casts into the waters of the Cheakamus River, just south of Highway 99 in the Whistler Valley. Since the August spill he said he hasn't caught any fish because they are not there.
BELOW: The Tenderfoot hatchery froze all specimens of fish, like this chinook, for evidence in the August Cheakamus River accident.
OPPOSITE PAGE: Brian Klassen surveys the Cheakamus.



The caustic soda that killed the fish in the Cheakamus is an odorless white solid used to manufacture everything from soaps and industrial cleaners to paper, cotton and petroleum products. Caustic soda, formally known as sodium hydroxide, can cause serious chemical burns, scarring, respiratory damage and blindness. When the soda entered the river it deprived the water of oxygen and caused an exothermic reaction — heating the river to burning temperatures.

"When you put your hand in the river after the spill, you could feel it burning your skin," Klassen said. "(The caustic soda) basically just swept through the system and killed everything in its way; it was like a cloud of death."

Most of the fish died because their gills were burned so badly that they couldn't get enough oxygen to breathe, Klassen said.

Near the hatchery, the Cheakamus River moves swiftly, flowing into the Squamish River before entering Howe Sound. The river is a major run for spawning steelhead, coho, chinook and pink salmon and a home to many other fish species and aquatic insects.

More than 90 percent of all fish in the river at the time of the Aug. 5 spill were killed, Klassen said, but a majority of the adult salmon and steelhead already had finished running upriver. Outmigrating smolt and steelhead suffered most of the damage.

"The main river channel was hit hardest," Klassen said. "There are still a lot of smolt coming out of the side channels so it wasn't a total loss, but we won't see the real damage until the returning runs start coming back."

Those runs will return in a couple of years. However, steelhead stocks were already in poor shape because of habitat problems including flooding, silting and decreased water flow. Most of these factors are the results of logging, hydro development, urbanization and flood control.

CN, founded in 1919, is one of the largest rail companies in Canada. The American-run railway specializes in shipping raw resources such as forest products, coal, metal and minerals, fertilizers, petroleum, chemicals and grain throughout Canada.

CN has a five-year average of 64 derailments per year. This number has begun to climb in the past few years, with 72 detrailments reported this year so far. Teamsters Canada Rail Conference, a union representing more than 3,500 CN maintenance workers, is urging the Canadian government to investigate the increased number of derailments.

Two days before the Cheakamus spill, a CN train derailed, dumping 43 cars and more than 300,000 gallons of bunker fuel oil onto the shores of Alberta's Wabamun Lake, a major recreation sight and home to more than 500 permanent residents.

Graham Dallas, a spokesman for CN, said the reasons for these two derailments are unknown.

"August was a bad month," Dallas said. "Fortunately, we don't see any common link between the accidents. Sometimes these things just happen."

In response to the recent derailments, the Canadian government's Transportation Safety Board has an ongoing investigation focusing on the operation of the train and its interaction with the track. The investigation is slated to take six months to a year.

After the derailment, the Tenderfoot hatchery received $80,000 to cover the immediate costs. Klassen said hatchery officials are putting together estimates and hope to receive more from CN in the future. CN has agreed to work with the Department of Fisheries and Oceans to continue to restore salmon stocks the Cheakamus.

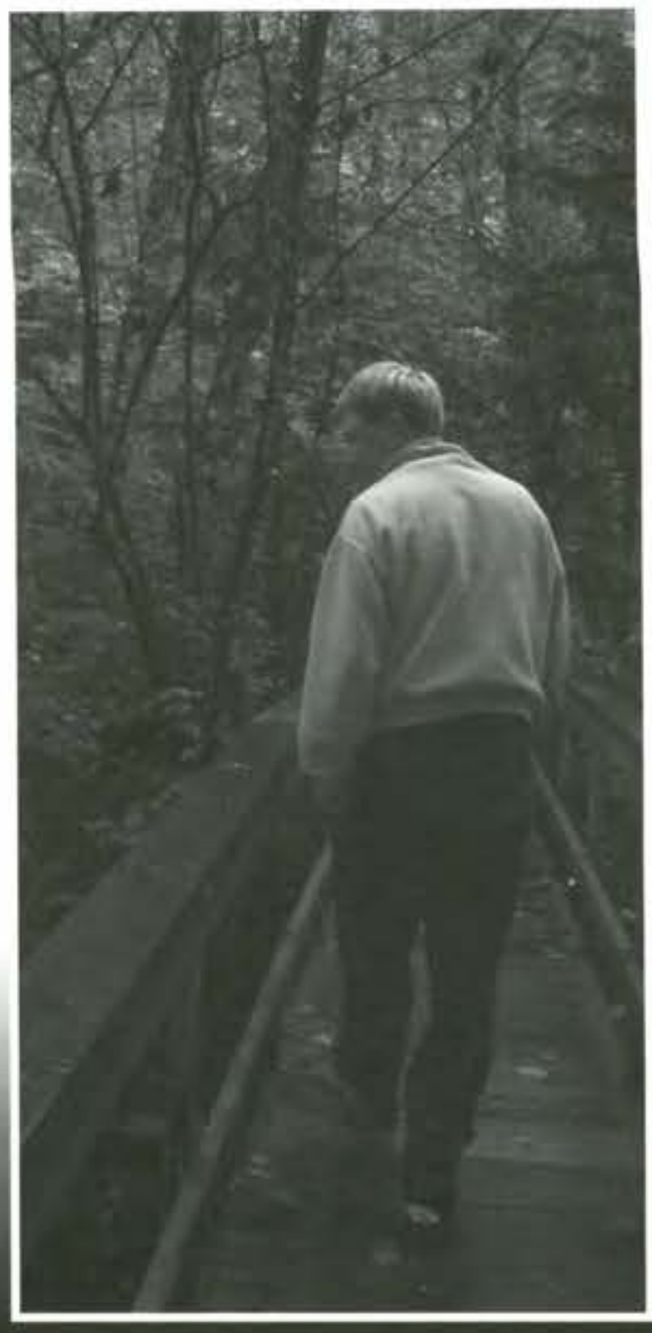
CN has claimed full responsibility for the spills and plans to remain an active member in the remediations. The CN chief executive, E. Hunter Harrison, has issued a blanket apology for any environmental damage and community disruptions CN might have caused and vows to cooperate as investigations continue.

Aside from being angry about the situation, many locals are just confused.

Squamish resident Harry Lemke has been fishing the Cheakamus for the past 15 years. When fishing reopened on Oct. 1, Lemke was back on the river, but he said it hasn't been the same.

"All the fish are dead. All the dollies. All the rainbows. All the fish and all the food the fish were eating are dead," Lemke said as he cast his fishing line again and again into an empty river pool. "I normally would have caught a few dollies by now, but there's nothing here."

Senior Krissy Post studies environmental education. This is her first published piece.



"When you put your hand in the river after the spill, you could feel it burning your skin."

Brian Klassen

Tenderfoot Hatchery technician

Jackie LeCuyer

the ISLANDER

Unearthing liability for leaking underground fuel tanks

by Jackie LeCuyer

photos by Khale Wallitner

For the past three months, a red Do Not Enter sign has hung from the poles marking the boundaries of a 20-foot-deep hole located in front of Lummi Island's only grocery store, The Islander. Caution tape wrapped around the rusted fence flutters in the wind.

The hole is 3 feet from of The Islander's two front doors. Inside the store, frozen food, candy, chips, souvenirs and movies for rent line the walls. Outside, however, is the site of a 40-year environmental hazard — four leaking underground fuel storage tanks.

The Islander began pumping gasoline in 1963, but permanently shut its tanks down in 1990 to avoid new Washington State Department of Ecology maintenance requirements for underground fuel tanks, storeowner Brad O'Mally said.

"It wouldn't have been profitable with the insurance costs and upgrades to continue pumping gas," O'Mally said.

O'Mally leases the property and building from the Johnson Family Trust, which bought the property and building in the early '70s from a construction company. In 1985, the business was sold to Gerald and Becky McRorie. O'Mally purchased the business from the McRories in 1989, and stopped pumping gas the following year.

"We basically shut everything down," O'Mally said. "The tanks have been sitting there for the last 15 years."

When O'Mally attempted to purchase The Islander property, Key Bank denied him a loan. The bank said it would not approve the purchase until O'Mally removed the two 6,000-gallon fuel tanks and the two 2,000-gallon fuel storage tanks.

"The banks will not lend with tanks on any property because it's a hazard," O'Mally said. "Let's say I go bankrupt. Who will own the property? They will. And if something goes wrong, they're liable. It's smart business."

ABOVE: Leaking pipes from four underground storage tanks, totaling 16,000 gallons of fuel, spurred a cleanup in front of Lummi Island's Islander that left the island's only gas station dry of all gasoline. A yawning hole, half the volume of the store itself, is all that remains at the removed tanks' uncovered gravesite.

OPPOSITE TOP: Brad O'Mally, the Islander's storeowner, holds onto the chain-link fence that encircles the excavated site where fuel storage tanks installed in 1963 were found to have been leaking and were forced by regulation to be removed.

OPPOSITE BOTTOM: The contaminated unearthed dirt left over from the tank's seepage was transported to the south side of The Islander, where Ultra Tanks personnel will add nitrogen to the soil and rototill it during dry days to evaporate as much of the gasoline contaminants from the soil.

Ecology encourages and sometimes requires underground fuel-tank owners to monitor soil, groundwater and tank tightness. In 1990, however, regulations were not as concerned with underground fuel-tank maintenance.

"The only reason we found out the tanks' pipes were leaking was because we had to remove them to buy the property," O'Mally said. "They would have just sat down there for years."

Owners must report underground fuel-tank leaks to Ecology's Toxic Cleanup Program within 24 hours. If the contamination is confirmed, the owner must submit a report to the regional office within 90 days; if contamination is not confirmed, a site-assessment report is required within 30 days.

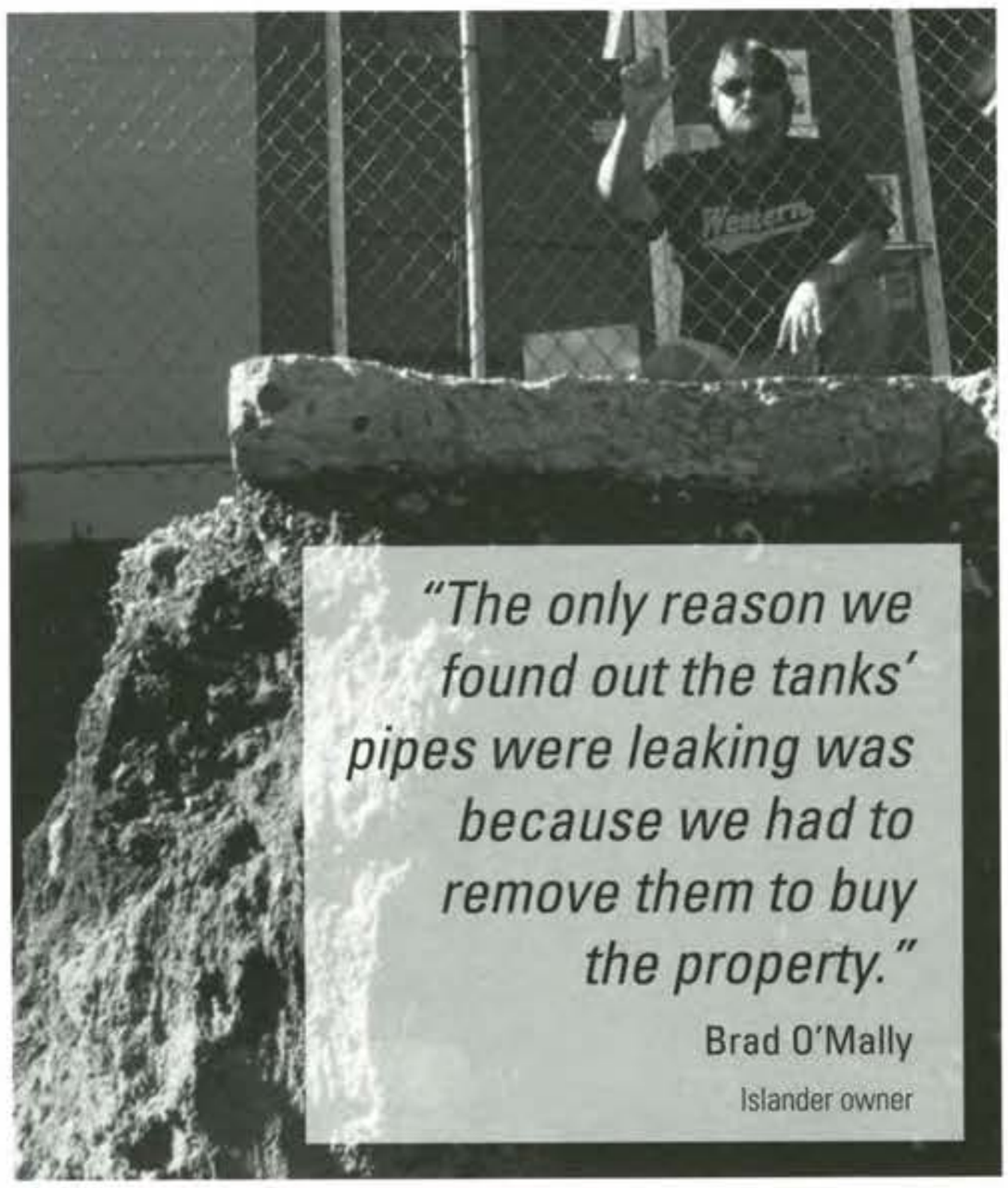
O'Mally and the Johnson Family Trust chose to clean up The Islander's contaminated soil voluntarily. Ecology does not order, oversee or approve independent cleanups; however, if the owners need guidance from Ecology officials, a $500 deposit will cover eight hours of assistance, said Dale Myers, Ecology voluntary cleanup director.

"When owners permanently close tanks, we require them to go through a process and then they will never be able to pump gasoline again," said David Storey, an underground storage-tank inspector for Ecology.

O'Mally and the Johnson trust hired Bellingham-based Ultra Tanks in August to remove the underground fuel tanks and purify the contaminated soil. The Ultra Tanks crew is relocating the contaminated soil to a fenced-off area 20 feet away from the side of The Islander. They will then add nitrogen to the pile of soil and rototill it during dry weather to increase the evaporation of gasoline contaminants. Gasoline doesn't degrade normally, but will degrade if burned or aerated. Moving the soil around with a rototill will accelerate evaporation, degrading the petroleum-pollution in the soils.

O'Mally and the Johnson trust began the task of cleaning up with the help of Ultra Tanks in August. Ultra Tanks will cover the mound of contaminated soil during the winter and begin working again when drier, warmer weather returns.

When the cleanup is complete, a privately hired site assessor will visit The Islander, take soil samples to ensure no gasoline is present and grant permission to refill the hole in front of the store with the once-contaminated soil. When the hole in front of The Islander is refilled, O'Mally plans to repave the parking lot and restore the access lane and 10 parking spots.



Although Ultra Tanks said it hoped to finish the decontamination process next summer, the controversy concerning the cost will not end so quickly for O'Mally.

"It's a sticky situation and the lawyers are saying different things," O'Mally said. "One says I'm liable because I own the store, the other says the Johnsons are liable because they previously owned the store." O'Mally said his lawyers are not involved at this point.

Lawyers representing the Johnson and McRorie families are determining what percentage of the final cost each prior owner will pay, but the Johnson Family Trust has covered the expenses to date, O'Mally said.

"We thought it would be a simple job," O'Mally said. "But this is a lot more than we expected."

Senior Jackie LeCuyer studies journalism. She has been published in The Western Front and The Review, the student newspaper at Edmonds Community College.

FORCE of NATURE

THE NOOKSACK'S CHANGE OF COURSE DEMANDS ACTION

by Wyatt Griffiths
photos by Bradley Thayer

A man approaches among the debris, shoeless, weathered and wielding a metal baseball bat. A recent theft has kept him suspicious of visitors. Behind him, four signs dominate the main entrance to a junkyard, three of which read: No Trespassing by Order of U.S. Government. The other indicates that Fire District #16 will not respond to emergencies beyond the entrance.

Tracy Nance is the full-time caretaker of Foothills Recycling, a recently closed waste disposal facility along the south fork of the Nooksack River. Fifteen years ago, Nance's friend, Robert McKay, began operating Foothills. He intended persuade Whatcom County officials to construct a barricade that would prevent the river from eroding the property.

McKay operated the site for more than 10 years as it became a common dumping site for residents, companies and tribal members. He accepted materials other regulated facilities either banned or had stringent disposal guidelines against, such as fuels, oils and batteries.

The roughly 4-acre site contains materials that pose threats to human and ecological health. The site received batteries, construction debris, metals, unlabeled oil drums, household wastes and automobiles still containing oil, gas, brake fluid and other fluids. The potential for chemicals within these materials to contaminate the soil, groundwater and surface water is a serious concern among Whatcom County officials, the Environmental Protection Agency, the Bureau of Indian Affairs and the Nooksack Tribe.

The EPA requires regulated facilities that accept automobiles to remove all fluids within a car before it can be stored, but that wasn't the case at Foothills.

"McKay felt that he was providing a service to the community by opening up his property for waste disposal," Nance said.

Tom Eaton, the associate regional administrator for the EPA, said the site is a jurisdictional gray area. Federal or state jurisdiction cannot regulate the site because the Bureau of Indian Affairs holds McKay's land in trust. Tribal officials have no authority either because his property doesn't fall within the Nooksack Reservation.

The Whatcom County Health Department complained about the site as early as 1993, but a lack of jurisdiction left the department with few options. In 2001, the county's concern triggered officials to encourage the EPA to get involved. Still nothing changed. It wasn't until the winter of 2005, when the river flooded its banks and began eroding an area that contained demolition debris, that government organizations got involved.

> ***"Chemical contamination from abandoned junk vehicles is the primary concern regarding hazards on the site."***
>
> Jeff Hegedus
> Whatcom County environmental health supervisor

"Politically, you have a hot potato," said Jeff Hegedus, environmental health supervisor for the health department.

Whatcom County, the EPA, Indian Affairs and the Nooksack Tribe are cooperating to evaluate and clean up the closed site. The EPA has provided approximately $300,000 in an effort to remove any potentially hazardous materials and push all waste at least 150 feet from the river's edge.

Chemical contamination from abandoned junk vehicles is the primary concern regarding hazards on the site. Hegedus said it's imperative that the 800 to 1,000 abandoned vehicles existing at the site be removed before the onset of winter.

"Nasty contaminants are associated with the auto industry," said Mak Kaufman, a stormwater inspector from the Washington State Department of Ecology Bellingham field office. "I know they have really nasty stuff in them because I spilled some brake fluid on my boot and it ate through the leather in about a week."

Automobile fluids contain a host of hazardous chemical compounds that in only minuscule amounts — parts per mil-

Force of Nature

"Staple sources of food for the fish populations in the Nooksack are in critical danger if automobile fluids contaminate their habitat. "

Jeff Hegedus
Whatcom County environmental health supervisor

lion or even parts per billion — can cause negative environmental and human health effects. According to the Agency for Toxic Substances and Disease Registry, used motor oil interacts with engine components and begins to dissolve the heavy metals associated with the surrounding parts.

Organic compounds in motor oil include polycyclic aromatic hydrocarbons, or PAH's which are toxic to young fish because they haven't developed an immune system. If the fish are exposed to oil and other toxic substances, it could ruin an entire year class, which is all individuals of a fish population spawned and hatched in a given year. The south fork of the Nooksack River is home to several species of fish and serves as spawning ground for endangered salmon and resident trout.

Dale Griggs, a recently retired fish biologist for the Nooksack Tribe, said that pink, chum and coho salmon, spring chinook, sockeye, and rainbow trout all inhabit the south fork at some point in the year. Salmonids are in the river year round in one stage or another.

Staple sources of food for the fish populations in the Nooksack are in critical danger if automobile fluids contaminate their habitat.

According to the EPA, benzopyrene, one compound in the PAH category, is present in internal combustion engines. The compound readily absorbs and adheres to soil particles, sediment beds and suspended particles in water. Aquatic organisms such as plankton, oysters and some fish species pass the compound up the food chain.

Hegedus said the river is threatening to cut off its meander and straighten out. If this happens, a portion of the site and its hazardous materials might be submerged or separated from the property.

McKay's property is located directly behind a cut bank, which is the erosion area on a river. In upcoming winters, floodwaters will continue to flood areas of the site unless the riverbank is stabilized.

"The river moved 300 feet into Bob's property and it took the levee out," Nance said, referring to the erosion last winter. "Nothing had leached into the river until last winter."

No scientific research has been conducted in the vicinity to determine changes in soil or water quality. To further compound the Foothills dilemma, two cities, Ferndale and Lynden, draw drinking water from the Nooksack River downstream of the site.

"We didn't find evidence that the soil was highly contaminated," Eaton said. "It's more of a junkyard dump than a toxic waste site, but still, it contains stuff you don't want in the river."

The "stuff" Eaton refers to illustrates the ambiguity of the situation. Not even McKay and Nance know exactly what was deposited at the site. No records were kept on companies that dumped materials on the site, and confessions concerning the disposal of hazardous wastes aren't piling up.

"It just wasn't done right," Nance said.

Senior Wyatt Griffiths studies geography. This is his first published piece.

RIGHT:
Tracy Nance is the full-time caretaker of Foothills Recycling along the south fork of the Nooksack river.

TOP:
A tire sits atop a mountain of trash approximately 150 yards from the Nooksack River cutbank.

TOP LEFT:
An oil can sits upside down in an old stove at the former Foothills Recycling.

OPPOSITE TOP:
After a decade, more than 800 cars have piled up in the yard

Shawn Query

STRAIT*FLUSH*

by Shawn Query
photos by Chris Huber

Tap water seems to disappear, swirling rapidly down pipes into a dark and cavernous underground world. No matter how filthy, it always returns clean from the faucet.

But wastewater and the chemicals involved in everyday household and industrial processes don't just vanish. In Bellingham, wastewater chemicals end up either in a septic tank or in the wastewater treatment plant. In Victoria, British Columbia, however, the majority of the wastewater ends up in the Strait of Juan de Fuca, almost entirely untreated. While the Post Point Pollution Control Plant in Bellingham runs wastewater through three treatment processes, Victoria's Clover Point and Macaulay Point outfall pipes discharge raw sewage into the Strait of Juan de Fuca, and so far the city has no plan to stop it.

Near the ferry docks in Old Fairhaven, the Post Point Pollution Control Plant is out of sight from the main road. Beyond the entrance, a variety of awards hang on the wall. The plant received an outstanding performance award for exemplary effort from the Washington State Department of Ecology every year from 1995 to 1998 and again in 2002.

"We stress doing the very best we can to protect the environment. We do a very good job, but we're looking for ways to do it better."

Larry Bateman
Post Point operations supervisor

Larry Bateman, 13-year operations supervisor for the plant, said the plant always has been committed to water quality.

"We stress doing the very best we can to protect the environment," Bateman said. "We do a very good job, but we're looking for ways to do it better."

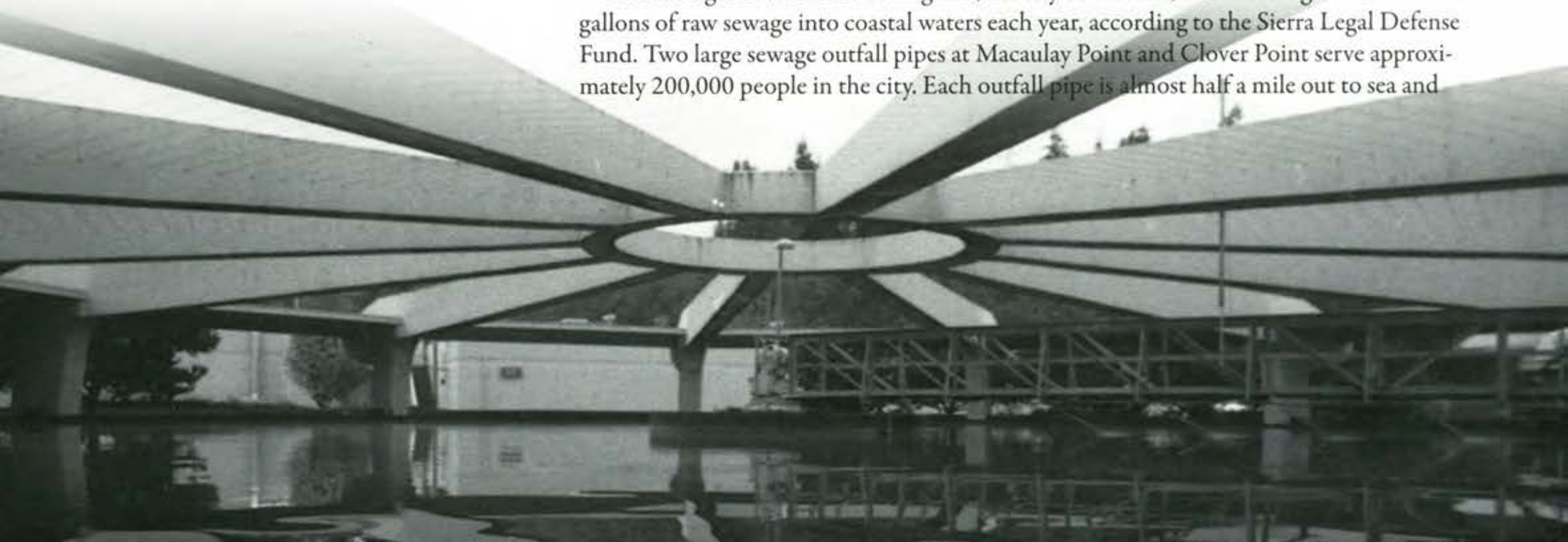
The plant serves 85,000 people and a few small industries in Bellingham through 250 miles of sewer collection mains, according to a pamphlet provided to Post Point visitors. Bateman said the plant has the capacity to serve a population of 16.1 million.

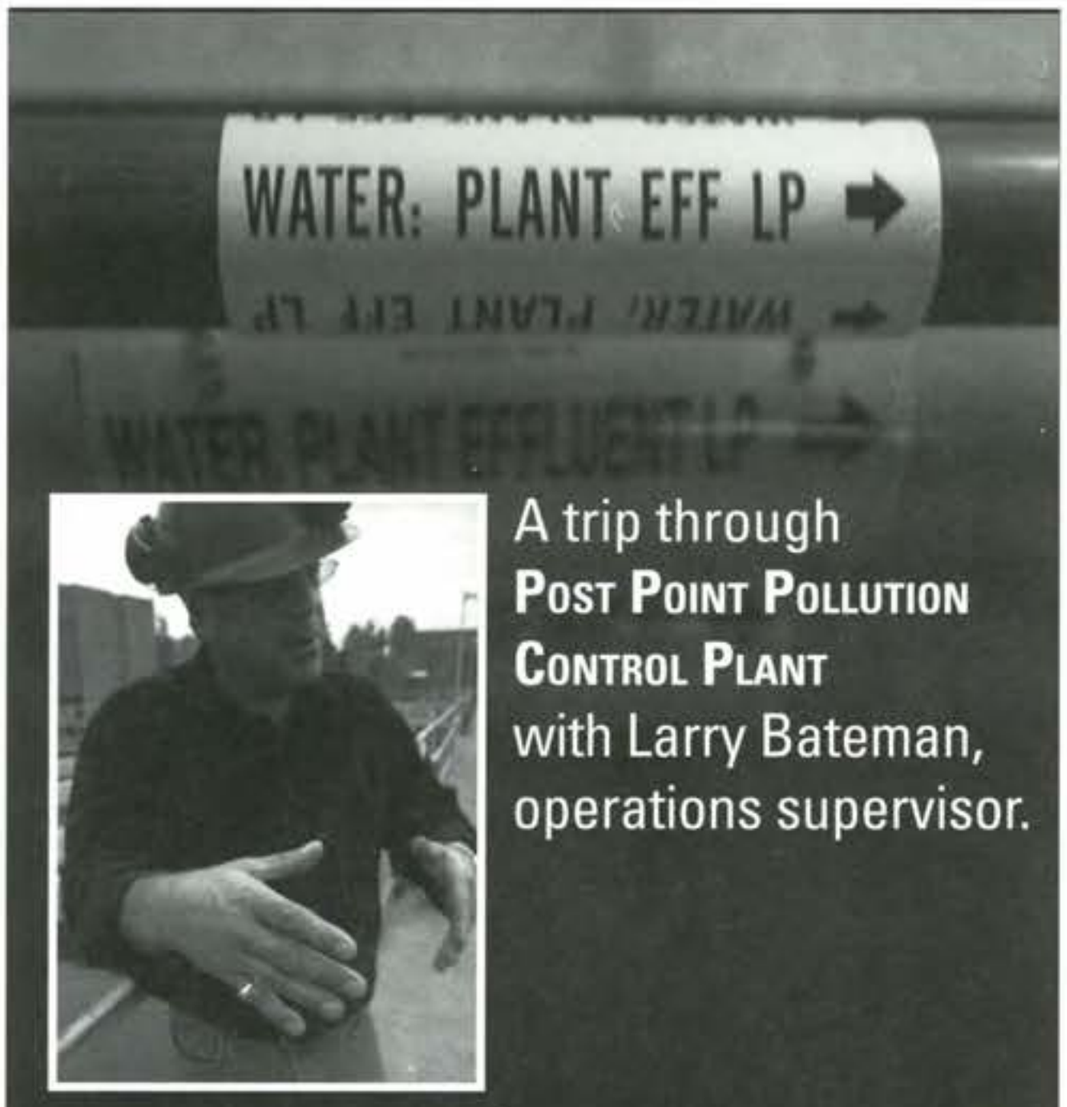
Leslie Higginson, a lab analyst at Post Point, is one staff member who works to ensure the plant has the least possible negative impact on the environment. Higginson and other lab workers test the effluent, or end product of the plant, to make sure the treatment plant is working effectively.

"Because we don't have a lot of big industries, we don't see a lot of toxic chemicals in our effluent," Higginson said. "It's pretty clean waste if you want to look at it that way."

Post Point uses preliminary, primary and secondary sewage treatment processes, each with a higher degree of cleansing and disinfection.

Across Puget Sound from Bellingham, the city of Victoria, B.C. discharges 129.4 billion gallons of raw sewage into coastal waters each year, according to the Sierra Legal Defense Fund. Two large sewage outfall pipes at Macaulay Point and Clover Point serve approximately 200,000 people in the city. Each outfall pipe is almost half a mile out to sea and





A trip through **Post Point Pollution Control Plant** with Larry Bateman, operations supervisor.

Preliminary Treatment

The preliminary treatment process first aerates the wastewater with oxygen and chlorinates it to control bacteria and reduce odors. Then bar screens sift out sticks, rags and anything bigger than half an inch, Bateman said. The last stage of the preliminary process is removal and incineration of any sand or gravel.

Primary Treatment

After preliminary treatment, the wastewater goes into the primary clarifiers, two large pools where suspended solids settle to the bottom and the "scum skimmers," as Bateman calls them, sift the oil and grease from the water surface. This process removes 70 percent of the suspended solids, Bateman said.

Secondary Treatment

During the next step in the treatment process mainly pure oxygen is pumped into sludge. This encourages the reproduction and activity of microorganisms, which then begin to break down the harmful contaminants in the wastewater.

"We grow a bacteriological culture that we feed organics every day," Bateman said.

The wastewater then passes into large pools called clarifiers where the microorganisms settle to the bottom and are then removed. These organisms are preserved to use again later in the same process.

At this point in the process, the water is 95 percent treated. The water is then chlorinated for one hour. Chlorine can be toxic in marine environments, so sodium bisulfite is then added to dechlorinate the water, which protects Bellingham Bay wildlife. The plant discharges the newly cleaned water into the bay roughly a quarter mile offshore and 60 feet under water.

Post Point burns leftover solids from the process in an incinerator at approximately 1,500 degrees Fahrenheit to reduce volume and remove pathogens. Then it treats waste gas from the incineration process to protect air quality. During this process, the solid waste is reduced by about 85 percent, Bateman said. Post Point sends ash or solids to a landfill in Roosevelt, in Eastern Washington.

roughly 200 feet below the surface of the water. The pipes are outfitted with a screen that filters out any solid objects larger than 6 millimeters, or about one quarter of an inch, said Laura Taylor, manager of scientific programs for the Capital Regional District, of which Victoria is a municipal member. Taylor has been working for the district since 1991 and is part of the team that monitors the sewage outfalls.

Despite public uproar about the sewage being "dumped" into the Strait of Juan de Fuca, no plans exist to change the system, Taylor said. However, the CRD has made an effort to monitor the chemicals discharged into the surrounding environment.

"We monitor the sewage for over 200 compounds," Taylor said. "Some that we do detect are heavy metals and some of the breakdown products of fossil fuels."

Dusan Markovic is a Victoria resident who studied the outfall areas for his master's degree at Royal Roads University. According to his study, among the most harmful chemicals contained in the Victoria sludge are chlorinated hydrocarbons, polychlorinated biphenyls, or PCBs, and heavy metals such as copper, chromium and zinc.

FAR LEFT: A view of the secondary treatment tank. Water goes through three stages of treatment and filtration before being routed to the ocean.

ABOVE: A small bottle of cadmium waste lay next to beakers and test tubes in the laboratory at the Post Point Pollution Control Plant.
ALSO: See graphic explaining biomagnification on page 18.

According to the Environmental Protection Agency, chlorinated hydrocarbons are chemicals found in some pesticides that do not readily break down in the environment and can bioaccumulate in the food chain.

PCBs are known to cause cancer in animals and have negative effects on their reproductive abilities, immune systems, neurological development, and nervous systems. The EPA also warns that similar health risks might occur in humans exposed to PCBs.

Although organisms require copper,

Shawn Query

"There's a lot of rapid mixture, but really all that raw sewage is going to be confined in the Puget Sound, not into open ocean."

Kevin Fitzpatrick
Washington State Department of Ecology water quality official

chromium and zinc elements for normal function, excess of these chemicals can cause distress in marine organisms ranging from behavioral changes to death, according to Markovic's study.

"(The CRD) monitors the sea floor on an annual basis," Taylor said. "The approach we take is that the level of treatment of the sewage is dictated by the environment's response."

The CRD did not state what response would cause it to change the level of treatment.

It is important for the wastewater to be carefully treated, said Christianne Wilhelmson, clean air and water coordinator for the Georgia Strait Alliance. The organization is devoted to improving the environmental conditions in the Strait of Georgia, a body of water on the east coast of Vancouver Island and between the United States and Canada. One of the main issues the group wants to change is the condition of Victoria's sewage outfall, which affects both the Strait of Juan de Fuca and the Georgia Strait.

"The biggest problem is that there is an assumption that you can dump waste and expect the environment to deal with it," Wilhelmson said. "The reality is that there is so much pollution in our world and some of it is so hard for us to do anything about. This is something we can do something about. We don't have to be polluting our waters with sewage."

Debate concerning the outfall is not confined to Canada. The outfall's proximity to Puget Sound is troubling to the Washington State Department of Ecology, said Kevin Fitzpatrick, the Northwest water quality program section manager.

"(The CRD's) idea is that it is a deep water outfall and that there is dilution happening in the straits," Fitzpatrick said. "There's a lot of rapid mixture, but really all that raw sewage is going to be confined in the Puget Sound, not into open ocean."

The technologies to make wastewater safer for the environment are available and are implemented at Post Point. But the Clover Point and Macaulay Point outfalls remain Victoria's main treatment. Wilhelmson said he suspects a budget issue is to blame.

A sewage treament plant that could provide secondary treatment would cost an estimated $200 million to $400 million. But Taylor said providing secondary treatment is not a priority for the CRD.

The CRD has more pressing environmental problems. Taylor said she doubts whether sewage treatment ever solves the problems of chemical contamination.

"Suppose you're concerned about mercury in sewage — secondary treatment does not treat mercury," Taylor said. "The mercury goes into the sludge and it doesn't disappear. 'Treatment' is a misnomer. People think that a secondary treatment plant produces clean water and solves all the problems, but it doesn't."

Batemen said he disagreed with Taylor's statement because all sludge is removed from the effluent during secondary treatment at Post Point, mercury included.

The issue of sewage treatment, Wilhelmson said, has been on the table in British Columbia for more than 30 years. Meanwhile, more raw and untreated sewage accumulates in the Strait of Juan de Fuca and the Georgia Strait.

"We are contaminating the ocean and not doing anything to stop that," Wilhelmson said. "It's time for us to hear voices. We're all part of this community. We share these waters. Hopefully people will raise their voices and make their opinions heard."

Junior Shawn Query studies environmental journalism. This is her first published piece.

ABOVE: Inside the generator room at the Post Point Pollution Control Plant.

Made in Washington

by Melanie Valm
photos by Taylor Williams

Bill Clark, the fish farm site manager, holds a seven-month-old salmon.

Four miles off the shore of Anacortes, the American Gold Seafoods fish farm is the floating home of 600,000 salmon living in eight square net pens, 30 feet deep. Grated metal walkways form a connecting path between and around each pen. The fish have been there for 14 months and are approximately 9 pounds. In 2001, U.S. consumers purchased nearly 165,000 metric tons of farmed salmon like these.

In the late 1990s, the United States produced approximately 33 million pounds of farmed salmon.

"Essentially, a salmon farm, just like a chicken farm, is a factory unit with the whole process becoming chemically dependent," said Don Staniford, a campaigner for Friends of Clayoquot Sound in Canada, an organization against the expansion of fish farms. Staniford has studied the chemicals used in fish farms in Scotland, Ireland, Spain, Australia, New Zealand and Chile.

He said farms use five chemical categories to raise and treat the fish: antiparasitics, antibiotics, artificial colorings, disinfectants and antifouling agents, which come primarily in the form of copper- or zinc-based paints used on the nets to prevent the growth of marine organisms such as mussels and barnacles.

During salmon production, farmers used approximately 25,143 to 41,905 pounds of antibiotics, according to a 2002 report by Dr. Charles Benbrook of the Northwest Science and Environmental Policy Center in Idaho.

Farmers use saltwater cages for the controlled harvesting of primarily Atlantic salmon. Farmers first raise the salmon in freshwater hatcheries at the farm site, and when the fish reach the proper age and size, the farmers transport them to the farms' near-shore saltwater cages. Here the salmon live for 18 months until harvested.

> *"Essentially, a salmon farm, just like a chicken farm, it is a factory unit with the whole process becoming chemically dependent."*
>
> Don Staniford
> Friends of Clayoquot Sound campaigner

Staniford said chemical seepage is one of his main concerns. Anything discharged into the pen will flow directly into the natural environment around the pen, affecting other marine species.

The uptake rate for antibiotics in salmon is 30 percent to 40 percent, which means the majority of the antibiotics end up directly in the water column. Because of this, chemicals the farmers use might alter the microbial and marine community around the farm, according to the David Suzuki Foundation, a Canadian environmental organization.

According to the foundation, antibiotics such as oxytetracycline have been shown to reduce the number of bacteria in the sediment around farms and reduce the ability of these organisms to recycle nutrients, reducing the conversion rates of sulphates and nitrates surrounding fish farms.

To control contamination, the Food and Drug Administration has a list of approved drugs for aquacultural use. Each state also has its own regulations, typically more strict than the FDA regulations. The Washington State Department of Ecology has approved the discharge of two antibiotics: oxytetracycline and sulfadimethoxine, which must be administered in the fish feed.

Kevin Bright, regulatory permit coordinator at American Gold Seafoods, said the company uses two chemicals on its salmon farm, one of which is oxytetracycline.

Antibiotic use is kept to a minimum to avoid high costs of the drugs and to avoid breeding resistant bacteria, Bright said. Typically, less than 2 percent of the feed used in one year contains antibiotics. Some years it's less than 1 percent.

"I want to keep these fish as pure as possible," Bright said.

Canada also prevents the use of premedicated feed in fish

Melanie Valm

farms, said Mary Ellen Walling, executive director of the British Columbia Salmon Farmers Association. Unlike terrestrial farms, in which farmers can buy feed with medication already included, veterinarians must specifically prescribe medication for individual fish farmers who then have the antibiotics milled into the feed. Overall, less than 3 percent of feed used in British Columbia each year contains antibiotics, Walling said.

Along with antibiotics, salmon farmers use a chemical dye in the feed to turn the salmon's flesh pink. Wild salmon get their pink color from their diet, mostly from eating krill, which contain a natural pigment called astaxanthin. Farmers use a synthetically produced version of this pigment to turn the farmed fish pink because they don't get the color naturally in their diet.

The FDA also has approved the use of canthaxanthin as a dye. This chemical has some possible health risks, reportedly contributing to eye defects; however, according to an FDA study, an adult would have to eat almost 55 pounds of salmon every day to experience these problems.

Because of the risks and concerns, the United States has regulations in place to prevent contamination of the environment and reduce threats to human health from chemicals.

The only U.S. salmon farms are in Washington state and Maine. To meet consumer need, the United States imports approximately 70 percent of its seafood. Nearly 59 percent of its Atlantic salmon imports come from Chile.

Other countries, however, do not have the same regulations the United States has regarding aquaculture. In his contribution to the book "A Stain Upon the Sea," Staniford lists Chile, Norway, Scotland and Canada as the worst four countries in the business, along with the Faroe Islands, a Danish possession north of Great Britain.

According to the Living Oceans Society, a fish farm in British Columbia confirmed the use of malachite green in its farmed salmon. Used as a fungicide and antiparasitic, malachite green is a banned substance in the United States and Canada and a suspected carcinogen. The chemical has been linked to tumors, birth defects and skin and eye injuries, Staniford said. The chemical has been detected in farmed fish from Chile, Scotland and several European nations as recently as 2003.

In four to six months the salmon at Bright's farm will be ready for harvest and sale. In the last two months, they switched color additive to an all-natural yeast formula instead of the synthetically produced astaxanthin, allowing them to label the fish as naturally pigmented instead of as "color added." Changes like this are numerous in the aquaculture industry. As long as consumer demand for salmon continues to rise, environmentalists and aquaculture farmers will have to work together to make the best and safest product available to customers.

Senior Melanie Valm studies environmental journalism. She has been published in The Western Front and The Planet.

WHAT SOME LOCAL BUSINESSES ARE SELLING YOU

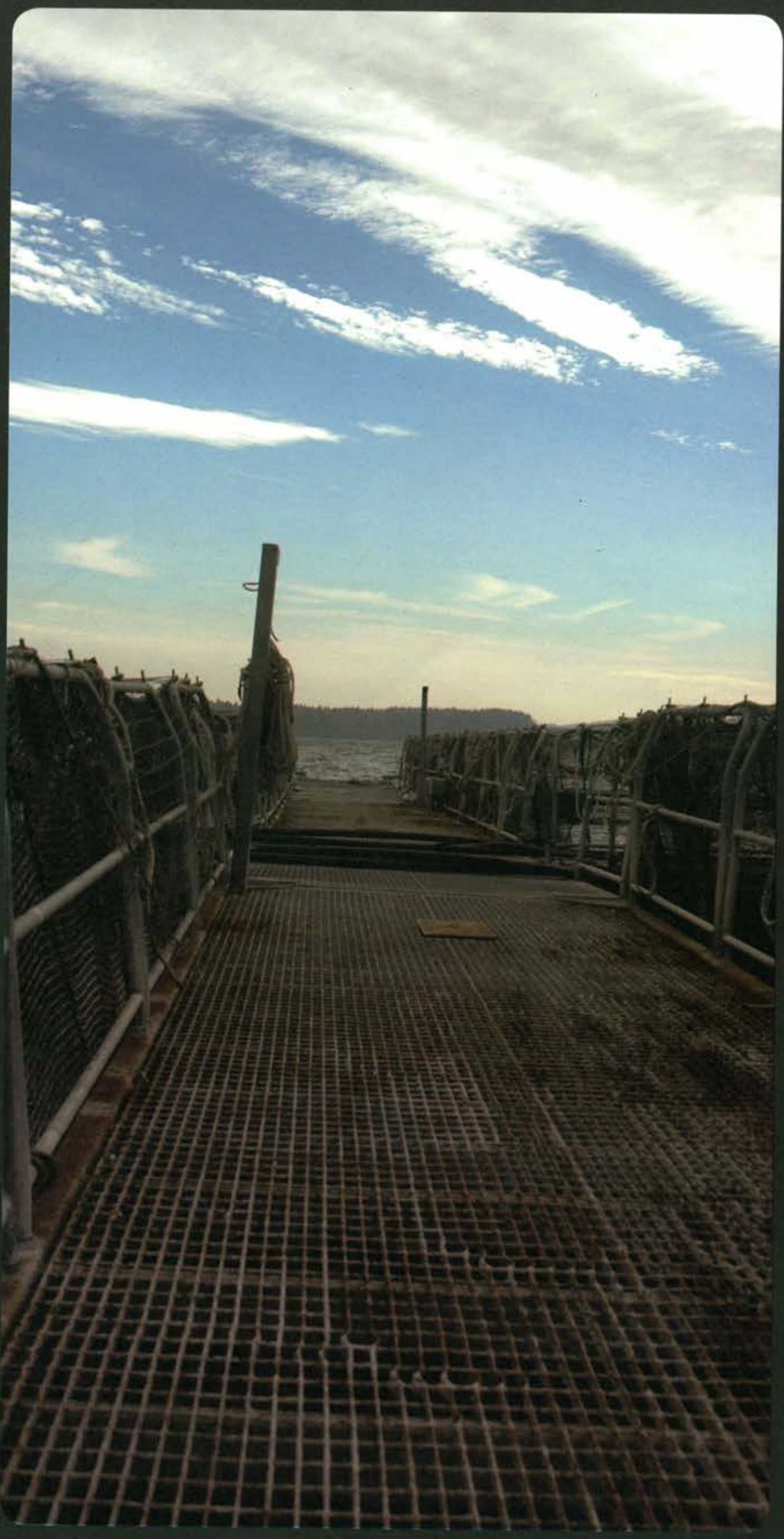
To determine whether a salmon is farm raised or wild, just look at the label. If it is a farmed fish, it is required to indicate so, either with the words "dye added" or something similar to "fresh salmon produced in Washington." If it is a wild fish, it will most likely say "wild" on the label, as commercial fishers use this as a selling point. At a restaurant, simply ask the wait staff what they serve.

	WILD	FARMED
GROCERY STORES		
Albertsons*	●	●
Community Food Co-Op	●	
Cost Cutter	●	●
Fred Meyer's	●	●
Haggen Food and Pharmacy	●	●
RESTAURANTS		
Anthony's HomePort	●	
The Cliff House	●	
The Marina Restaurant	●	
The Olive Garden		●
Bayside Cafe	●	

*Wild only when in season

FROM RIGS TO REEFS

Legislation was introduced to Congress in September that would allow oil companies to convert commission rigs into fish habitat. If the bill passes, oil companies will have the option of selling the platforms to aquaculture companies that would convert them into a marine farms, or cut the top off the rigs and abandon them in the ocean, leaving them for the fish to take over. This legislation would relieve the oil company of the responsibility and cost of cleaning the rigs and the site, and would grant the company tax breaks for the contribution to mariculture or scientific research.



OPPOSITE TOP: Farmed fish are kept in different tanks according to age and are fed by an automated machine. RIGHT: This American Gold Seafoods farm has three anchored stations located off the Anacortes coast near Cyprus Island.

FULL CERCLA

WHEN POLLUTERS AGREE TO PAY IN PART WHO WILL PAY THE REST?

by Nate Warren
photos by Khale Walliter

Many Bellingham residents might not be aware of it, but tucked away in this cheery community is what the Environmental Protection Agency deemed one of the nation's most contaminated hazardous waste sites. Overlooking the northwest corner of Bellingham like an ominous lighthouse, a cooling tower broadcasts the name "Oeser" in deep maroon. Past the entrance gates, freshly treated telephone poles are neatly stacked like gigantic cigars.

This is the Oeser Cedar Company, a 26-acre wood treatment plant on the outskirts of Marine Drive. In August, Oeser agreed to pay $8.6 million for federal cleanup costs — eight years after the EPA targeted the site for its unsafe levels of toxins and possible connection to water contamination in Little Squalicum Creek. The facility had been treating cedar since the 1940s, an era when environmental law was far from perfect.

"Many wood companies tend to have messy operations," said Mary Jane Nearman, the EPA's Oeser project manager.

Oeser president Chris Sechrist was unavailable for comment on the issue at the time of publication.

On Dec. 11, 1980, Congress enacted the Comprehensive Environmental Response Compensation Liability Act — or CERCLA — which has since become the country's most effective method for holding companies responsible for hazardous waste released. The law, commonly called Superfund, created a tax on the chemical and petroleum industries that gave the U.S. government the authority and money needed to respond to hazardous wastes that threaten public health.

"As a former mayor, you learn that this situation is actually a tough choice. You have to think about the economy and job growth, yet also balance it with citizens' own health."

TIM DOUGLAS
Former Bellingham mayor

In 1997, the EPA added Oeser to the nation's Superfund list for 60 years of gradual soil and groundwater contamination, including significant levels of pentachlorophenol and polycyclic aromatic hydrocarbons, or PCP, in surface and subsurface soil, in groundwater and in a deepwater aquifer. Nearman said the EPA carried out a cleanup for immediate risk in 1999, which consisted of removing the most contaminated soil — a process consuming the better part of nine months.

Creosote is the black, sticky substance used to preserve wood such as railroad ties and telephone poles. Oeser used the substance for more than 40 years. Since the mid-1980s, Nearman said Oeser replaced creosote with PCP as its preservative. Both are hazardous.

"PCP burns, so when steam engines or locomotives were used to transfer logs, combustibility was an issue," Nearman said.

Creosote and PCP are dangerous to the skin, but most importantly the EPA warned companies to keep these chemicals out of contact with public drinking water.

Little Squalicum Park is a 320-acre forest next to Oeser. It is lined with a pebble trail leading to the water. According to a Washington State Department of Ecology fact sheet, the park also contains dioxins, copper and zinc. Ecology considers Bellingham Technical College, the Birchwood neighborhood, a railway bridge and Oeser potential culprits for contamination in the park.

"Oeser isn't a determined source," said Mark Herrenkohl, a scientific consultant the city of Bellingham hired to cover the creek's Remedial Investigation and Feasibility Study. "That's why we're here, to find out."

Herrenkohl, who has been clearing brush in the area to take soil samples, said Ecology listed Little Squalicum Creek at a No. 1 hazard ranking.

"The RI/FS is a supplementary sampling that is reverified if insufficient data from an area where an unexpected 'hit' or contaminant is found," said Mary O'Herron, the Little Squalicum Park site manager for Ecology.

The recreational area also must meet regulations of the Washington State Model Toxics Control Act, which includes extensive ground and surface water testing and statistical analysis.

"The creek has levels of contaminants related to the Superfund, although Oeser will say different," said Tim Wahl, the city's project coordinator for Little Squalicum Creek.

Jack Weiss, executive director of the Oeser Cedar Cleanup Coalition, agreed that the company didn't consider the creek. The coalition is composed of community members from areas neighboring the Oeser site and is unaffiliated with the EPA or Oeser itself. Weiss said the organization "keeps tabs" on the cleanup efforts.

"Air pollution, noise pollution, the stench of PCP and diesel oil is not pleasant," Weiss said. "Many people have had respiratory problems, including my wife."

Weiss and the Cleanup Coalition aren't the only ones concerned. Charles Caldart, attorney with the National Environmental Law Center, is one of two lawyers who filed a lawsuit against Oeser in 2002. The center sued Oeser for violations of hazardous waste laws against water, soil and air pollution.

"PCP is a probable human carcinogen that has a variety of negative effects on aquatic life," Caldart said.

Although Nearman believes that Oeser has been responsible and met the requirements of the EPA, she said the community's concerns are legitimate.

"It's reasonable to think this if a facility is nearby," Nearman said. "It's good to have folks pushing for those answers."

Locating and resolving the source of the Superfund contaminants is the next step. Nearman said the cleanup calls for capping the soil or removing soils with high levels of toxic waste.

"No matter what cleanup they do, you won't be able to build parks or houses on it," Weiss said. "The high level of dioxins will only permit for industrial structures."

Weiss said his organization doesn't accept that capping the toxins with asphalt will work as an adequate mitigation method. He said asphalt can crack, and it's possible for the contaminant to spread.

Oeser agreed to fund $500,000 toward remediation of the creek, Nearman said.

"The business just wants to stay afloat and the EPA must keep their standards up," said Tim Douglas, Bellingham's former mayor. "As a former mayor, you learn that this situation is actually a tough choice. You have to think about the economy and job growth, yet also balance it with citizens' own health."

Since its listing, Oeser will have contributed approximately $15 million to clean up the wood treatment facility, Nearman said. But Weiss said he believes the government will need approximately $20 million to fix the pollution problem, and Oeser isn't paying enough.

"Oeser will pay $15 million — the rest goes to taxpayers," Weiss said. "In true Republican fashion, they'd rather see taxpayers pay than a company go out of business."

Sophomore Nate Warren studies journalism and sociology. He has been published in The Columbian in Vancouver, Wash.

Kiah Hooper & Sam Lax

POINT source

Identifying Whatcom's Worst Polluters

by Kiah Hooper & Sam Lax
photos by Dylan Hart

A giant crane looms idly on the far end of the dock at Intalco Aluminum Corp. on Cherry Point. Here, workers unload monthly shipments of alumina ore into metallic veins and transport them to the main factory to be refined into market-grade aluminum. A fine, gray dust of remnant ore blankets its route of travel from the dock to the interior factory, clinging to the corrugated warehouses and long alleyways between. Amid the hum of machinery and lingering scent of sulfur dioxide, 400 workers are scattered about in desolate superstructures, turning a raw resource into a commodity.

"We're proud of what we do here," said Dave Ringwald, a chemist on Intalco's environmental staff, "even though it doesn't look like much from the outside."

From Bellingham to Blaine, industrial facilities of various sizes pollute the soil, water and air in Whatcom County. The same facilities that produce the commodities many Americans rely on also put human and ecosystem health at risk. The atmosphere and the marine waterways surrounding Whatcom County bear the cost of production and consumption.

The following information is not meant to slander the industrial leaders in Whatcom County, but to better expose their practices to the public so all members of the community can work together to mitigate environmental and human health risks.

ALUMINUM

When people wrap their leftovers in aluminum foil, or a cyclist takes an aluminum-framed bike out for a ride, the health of the ozone or of the phytoplankton in the Georgia Strait seem to be unrelated. However, Intalco Aluminum Corp.'s aluminum production affects both by creating chemical pollutants such as carbonyl sulfide, hydrogen fluoride and cyanide.

During the production of primary aluminum, Intalco expels 280,000 pounds of carbonyl sulfide into the atmosphere each year, according to the EPA's Toxic Release Inventory. The accumulation of carbonyl sulfide in the atmosphere increases the efficiency of bromine and chlorine chemicals present from past pollution, which destroy the earth's protective ozone layer, according to the National Oceanic and Atmospheric Administration.

Through widening holes in the ozone, radiation disrupts marine ecosystems. Phytoplankton are unable to photosynthesize properly with increasing ultraviolet-B rays, which can result in their diminishing populations. This affects the marine food chain through bioaccumulation — or the increase in concentration of a pollutant from the environment to the first organism in a food chain — because the biomass at the bottom of the food chain must be the greatest to support all proceeding links.

Another chemical waste product of aluminum production is hydrogen fluoride. Intalco emits 93,000 pounds of hydrogen fluoride — or enough gas to fill more than eight Goodyear Blimps — every year, according to the TRI.

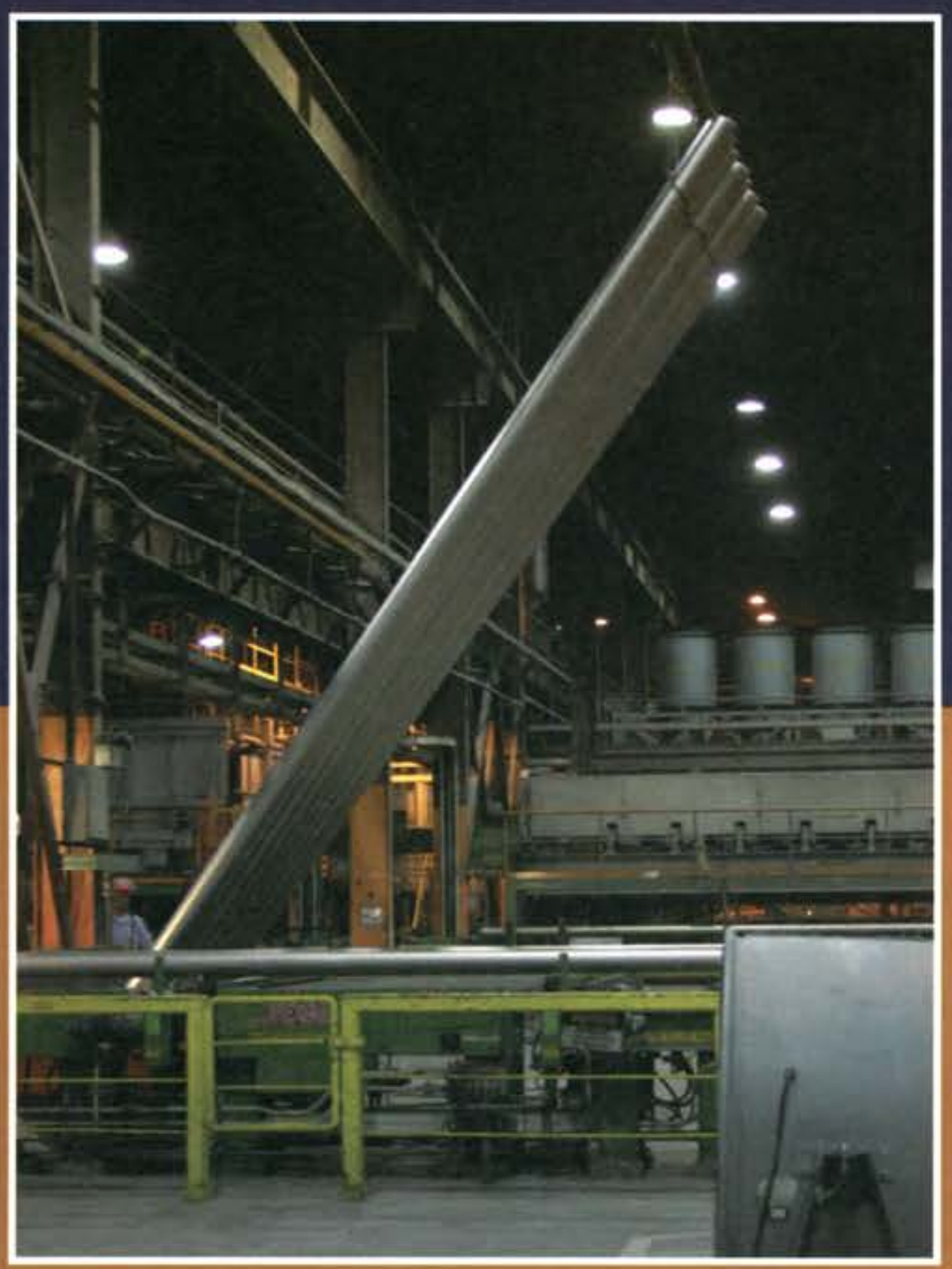
Clouds, fog and rain absorb hydrogen fluoride gas to form hydrofluoric acid, which falls to the ground as acid rain.

"Hydrogen fluoride has a very high affinity for water," Ringwald said. "(It) is also very acidic; in fact, it has the highest acidity in the universe."

Tim Schon, Intalco's environmental manager, said the plant has a system that captures 99.6 percent of all hydrogen fluoride and other airborne pollutants used in production.

Ringwald said he would compare the capture system with a large vacuum that sucks the chemicals out of the warehouses and then contains it in a large bag that the company can monitor and change every few months. Ringwald said the system needs

Intalco uses this crane to load finished aluminum product onto ships to be distributed to buyers.



To publish his photographs of the tour at the Intalco facility, Planet photographer Dylan Hart had to have the company first review the images. Intalco withheld many of the images taken within their facility because they contained details considered private information.

While photographing the ConocoPhillips facility on Lake Terrell Road in Ferndale, Hart and reporter Sam Lax were approached by a security guard who promptly asked for their names and phone numbers along with their vehicle license plate number. He asked for the roll of film, but Hart denied his request. The security guard informed The Planet staff that their personal information was going to be submitted to the Bellingham Sheriff's Office. Lax was contacted by the Sheriff's office, but no one was arrested.

Representatives from BP and ConocoPhillips said photographing their facilities is prohibited because of homeland security and company policy. Both companies said a limited number of photographs are available on request.

improvements because it is not foolproof. For example, open warehouse doorways and technological inefficiencies can create leaks that release small amounts of gas, and not every release is reported, Ringwald said.

Intalco also produces K088 waste, which contains cyanide. K088 is hazardous waste from the dead cathode portion of a large battery used to heat alumina. This cathode actually is a carbon layer inside of a large pot. The carbon layer gains toxicity throughout its life. After a cathode is spent it becomes hazardous waste. Intalco is working to figure out how to make the battery last longer to decrease the amount of waste produced, said Mike Rousseau, Intalco's plant manager.

Intalco's Cherry Point plant produces 307,000 tons of aluminium each year, enough to make 18.4 billion beverage cans.

Intalco's environmental policy states that the company understands the importance of protecting the environment, but asserts that improvements depend on time and money. Intalco's environmental goals during the next few years include an improvement in stormwater collection and treatment, a reduction in the use of fluoride, a reduction in the accumulation of spent aluminum potliner, and a 20 percent reduction in electricity use.

"If we are in compliance with governmental regulations then we feel we are justified," Schon said in response to Intalco's contribution to pollution in Whatcom County. "But we want to go beyond. Working with the community is extremely important to us."

OIL REFINERIES

High-rising tanks and pipes at the BP Cherry Point refinery constantly retain thousands of barrels of crude oil as workers heat and convert it into conventional products. The older metallic structures at the ConocoPhillips refinery meanwhile do the same. Both refineries persistently emit pollutants that, among other things, contribute to acid rain.

The BP Cherry Point and ConocoPhillips refineries receive crude oil from Alaska for refining it into a usable commodity such as gasoline. Both companies annually report to the EPA their production of 29 hazardous chemicals, including benzene and toluene compounds, which the Washington State Department of Ecology identifies as known carcinogens. Among the most dangerous chemicals released from the refining process are sulfuric acid and nitrates.

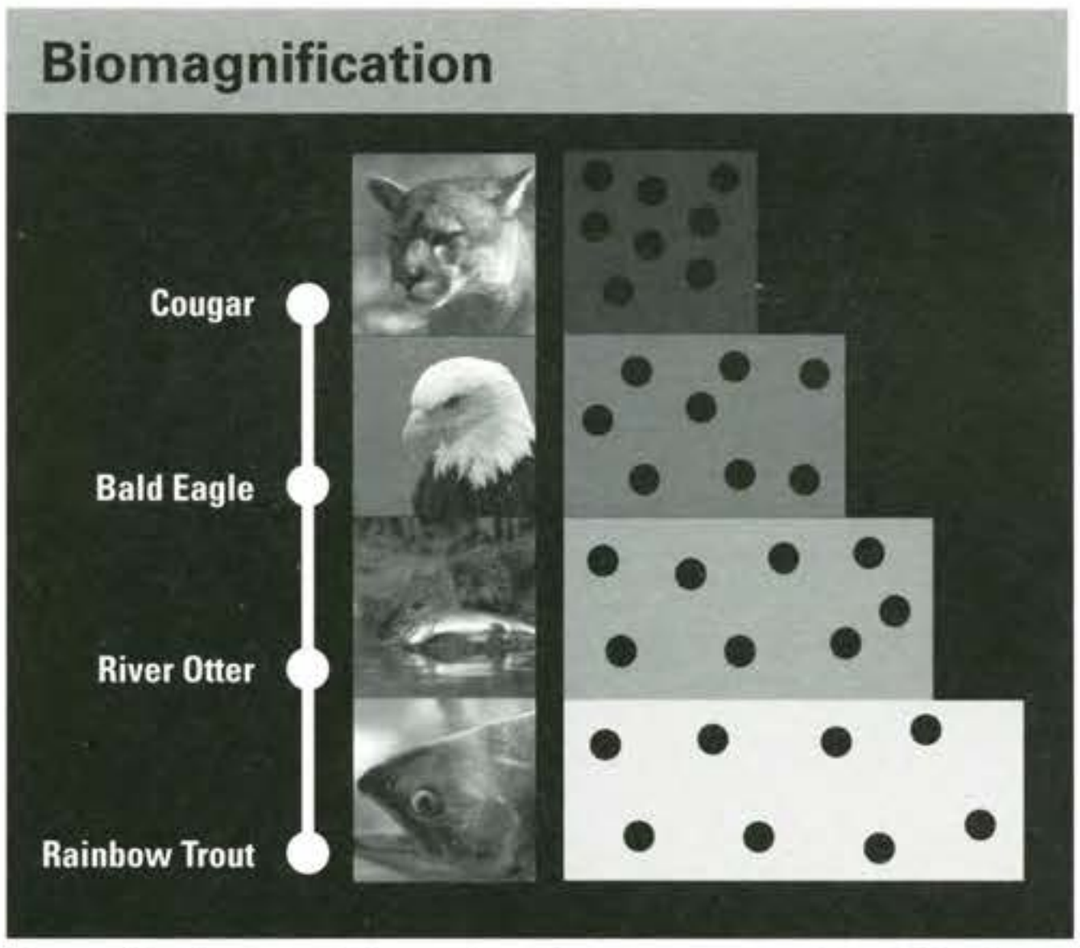
Every year BP's Cherry Point refinery emits 85,000 pounds of sulfuric acid, while ConocoPhillips emits 29,692 pounds. Highly corrosive and harmful to forest ecosystems, sulfuric acid and its effects extend beyond Whatcom County. Strong winds can carry the chemical hundreds of miles, where it might fall to the ground in rain or remain as dry particles and accumulate in the air.

Sulfuric acid is highly caustic, erosive to teeth and a respiratory irritant for humans. Also, children are more prone to respiratory ailments from its inhalation because children breathe more air per kilogram of body weight than adults do, according to the Agency for Toxic Substances and Disease Registry.

Nitrogen naturally cycles through the environment, but high volumes of nitrogen can cause rapid growth in forests, resulting in imbalanced forest systems. As a result, the roles of plants and animals in the ecosystem shift and existence of integral species are threatened. The TRI reports that in 2004 BP Cherry Point released 27,000 pounds of nitrate compounds and ConocoPhilips released 31,429 pounds into the Strait of Georgia.

"Ultimately it's up to all of us to ensure that (toxic chemicals) are being properly handled; every member of the public is responsible," said Karen Payne, manager of health, safety and environment at the BP Cherry Point refinery.

Kiah Hooper & Sam Lax



Biomagnification is the build up of certain substances, such as DDT, in the bodies of organisms at higher trophic levels of food webs. DDT was once used extensively as an insecticide. DDT builds up in the fatty tissues of organisms. Organisms at lower trophic levels accumulate small amounts. Organisms at the next higher level eat many of these lower-level organisms and hence accumulate larger amounts. At the highest trophic levels the increased concentrations in tissues might become toxic.

Source: Mcgraw Hill Publishing

The BP Cherry Point refinery has made many amends to its oil-refining process to reduce total emissions. Payne said one example of BP's efforts is its frequent monitoring to control valve leaks throughout the refinery. BP has inspected more than 100,000 checkpoints on individual pipes and connecting valves during the past 10 years to reduce its fugitive air emission significantly, Payne said.

"Every time a pleasure boat or a car spills gasoline, is it reported?" Payne asked in response to whether BP's Cherry Point refinery reported each chemical release. "We have to be scrupulously accurate and honest and credible. That's part of the way we do business here every day."

To improve the efficiency, BP Cherry Point attempts to use as much of the crude oil as possible. Every day at BP Cherry Point, 225,000 barrels of crude oil are processed, creating approximately 229 tons of sulfur per day for resale.

"Every year spills are reduced, flares reduced, emissions reduced — we have to get better all the time," said Gary Solari, manager of health, safety and environment at the ConocoPhillips refinery. "If we aren't good environmental stewards, then we're out of business. If the community is upset, we're out of business."

Everything is interconnected: Intalco receives calcined coke from BP for its aluminum production; operations at all three companies are conducted with machinery, composed in part of aluminum, which are fueled by oil refined at ConocoPhillips and BP.

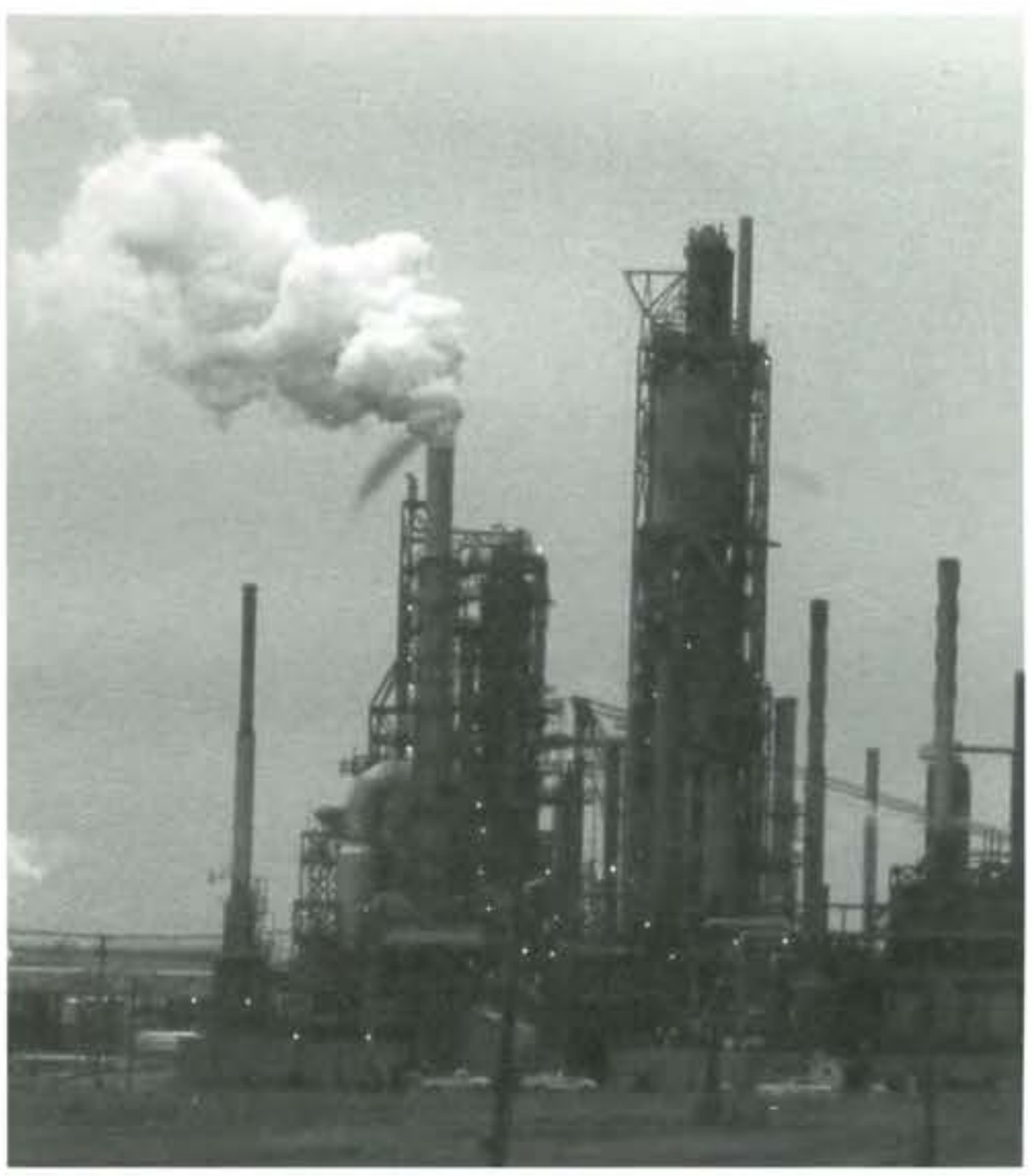
"In a refinery, we try to use everything but the squeal, including carbon dioxide that we sell to Praxair to put in carbonated beverages, sulfur that we sell to the fertilizer industry, and calcined coke that we sell to the aluminum industry," Payne said.

Between these three companies it is difficult to assign rank and to state clearly which company is the worst polluter. The long-term effects of chemicals released at all three factories are uncertain. Intalco wins in the realm of volume of chemicals produced, but ConocoPhillips and BP Cherry Point release chemicals more persistent and detrimental 10 to 20 years down the line. Though all three have released millions of pounds of chemicals into the environment spanning the course of their existence, the citizens in this county and others throughout the United States share responsibility because individual consumers aid in creating the pollution the companies produce.

Identifying the consumers as Whatcom's worst is unavoidable. According to the Department of Ecology, 57 percent of pollution in the state is due to car and truck emissions, while industrial pollution accounts for 17 percent.

To maintain society's fast-paced lifestyle, these companies are essential. Not only are these industries necessary for economic stability, but also society relies overwhelmingly on their products. As society builds higher, neglect of the environment and of human health destroys the foundations that are attempting to support the ever-increasing weight.

Junior Kiah Hooper studies pre-medicine and art. Senior Sam Lax studies environmental education. This is their first published piece.



The Conoco-Phillips plant as seen from Lake Terrell Road in Ferndale.

GREEN'S KEEPER

COUNTY GOLF COURSES FACE THE CHALLENGE OF FINDING MORE ENVIRONMENTALLY CONSCIOUS PRACTICES TO MAINTAIN THEIR COURSES

by Andrew Morgan

The ground around Sudden Valley Golf & County Club's turf maintenance facility is a mixture of sand and mud. The musty garage smells of freshly mowed grass and gasoline.

Year after year, golf course superintendents use chemicals to maintain a high-quality and aesthetically pleasing playing surface. Faced with high expectations from golfers, superintendents apply fertilizers and pesticides to stimulate growth and eradicate "pests." When used in excess, these chemicals can have harmful effects on nearby bodies of water. Golf course maintenance has come under increased scrutiny from environmental agencies, leading many superintendents to adopt more environmentally conscious practices.

When dealing with the chemicals, superintendents who have adopted such tactics focus on protecting water quality.

The Environmental Protection Agency defines appropriate use of fertilizer as no more than 1 pound of nitrogen per 1,000 square feet for a given application.

ABOVE: Meticulous lawn care and picturesque vistas typify the visual pleasure that's synonymous with Semiahmoo's name.

Photo: Khale Wallitner

Andrew Morgan

Fertilizer is typically mixed with three parts nitrogen to one part phosphorus to three parts potassium.

Most fertilizers golf course superintendents use contain phosphorus. When used in excess, phosphorus-based fertilizers can speed up a natural process known as eutrophication. This occurs in aquatic ecosystems when high nutrient concentrations result in algal blooms. Rapid growth of algae can shade the water below, effectively killing subaquatic vegetation other organisms rely on for food and oxygen. As the algae die, the decomposition process consumes oxygen from the water, often suffocating other aquatic life such as fish.

When the algae begin to bloom, concerned citizens and environmental advocates begin to look for potential sources. The Sudden Valley Golf & Country Club and residential lawns are common suspects for increased levels of phosphorous in Lake Whatcom, a drinking water source for 85,000 residents.

Most of Whatcom County's 14 courses are near bodies of water, wetlands and streams. Bellingham's Sudden Valley course is one such course, draining its runoff into Lake Whatcom.

"The concern is that too much phosphorus leads to increased algal blooms, which decrease oxygen," said Tim Paxton, president of the Clean Water Alliance, an advocacy group for Lake Whatcom. "The golf course was specifically exempted from the phosphorus ban. It would be nice to not have a scum-covered pond providing our drinking water."

The superintendent is responsible for all decisions regarding turf care and management and decides how much fertilizer and pesticides to apply and when. No governmental agencies monitor golf course water quality. The only requirement for golf courses is to have a state-licensed chemical applicator on staff, usually the superintendent.

Although most intensely treated, the greens make up approximately 2.5 acres of a 130- to150 acre course. Bryan Newman, superintendent at the Sudden Valley Golf course, said he sets his thresholds at no more than 6 to 9 pounds of nitrogen per 1,000 square feet each year for greens and 2 to 6 pounds of nitrogen per 1,000 square feet each year for fairways. These levels are typical for courses in this county and are lower than the EPA's recommended nitrogen levels.

"I don't like the perception that what I do is detrimental to the environment. I don't consider myself a polluter," Newman said. "I consider this perception to be one of the few bad parts of my job. Golf courses do a lot of good for the community and the environment."

Paxton and Newman illustrate the rift in knowledge between environmental advocates and golf course superintendents. Though representing opposing sides of an issue,

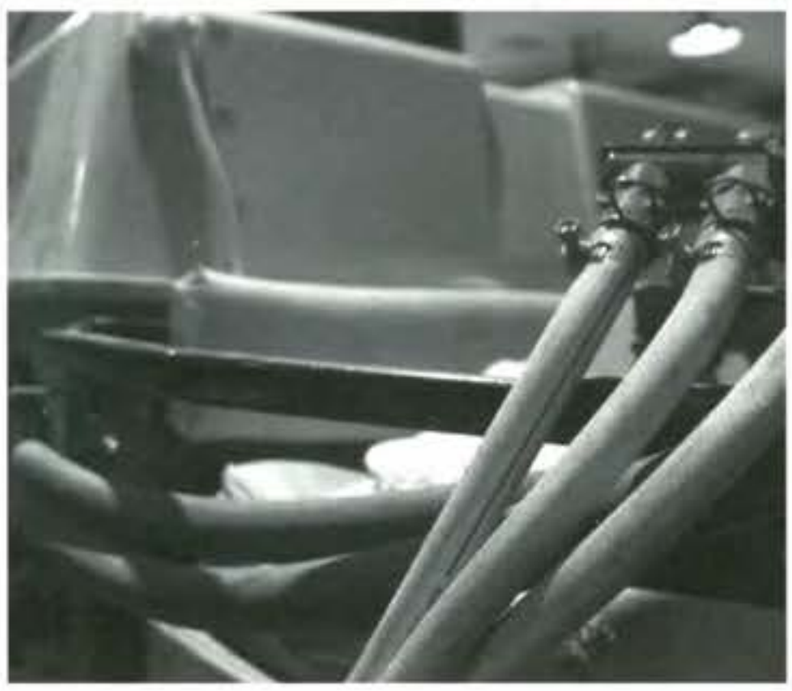
ABOVE: Diagram of human induced eutrophication. Eutrophication is the natural aging of lakes or streams brought on by nutrient enrichment. Human activities can greatly accelerate this process.

RIGHT: Eighteen holes of trimmed and glitzy green grass comes at a price. This particular pond at Semiahmoo Golf & Country Club consumes the runoff of fertilizers and herbicides applied to the neighboring fairways and greens.

Photo: Khale Wallitner

"The concern is that too much phosphorus leads to increased algal blooms, which decrease oxygen. The golf course was specifically exempted from the phosphorus ban. It would be nice to not have a scum-covered pond providing our drinking water."

TIM PAXTON
Clean Water Alliance president



ABOVE: Early morning golfers ride on a trail that runs near a fairway at Sudden Valley Golf & Country Club, which overlooks Lake Whatcom.

LEFT: Machines like the one pictured are used to distribute fertilizer that is composed of a ratio system, typically 3:1:3 nitrogen to phosphorus to potassium. This ratio varies with phosphorus always being the lowest.

Photos: Chris Huber

neither claims to be an expert on the other's cause and both said they feel they provide important services for the community.

Audubon International organized the Cooperative Sanctuary program in 1991 to educate the public on golf course maintenance practices and to encourage course managers to use environmentally friendly techniques. The program requires an approved environmental testing organization to check water quality of all bodies of water on a course. The organization must test streams running through the property at points before and after the course.

"Once we have worked with a course and buffers have been put into place, we find the water is cleaner when it comes out than when it came in," said Joellen Zeh, the program manager for Audubon International. "(Our program) works with courses on an individual basis to protect and sustain land, increase natural habitat off-course, conserve natural resources and reduce the use of fuels and chemicals."

Zeh said she recognizes the pressure on golf course superintendents to keep a pristine course. She calls this the "Augusta syndrome," referring to a prestigious course where professional golfers play the Masters tournament, one of golf's biggest events.

"People see these tournament courses on TV and ask, 'Why doesn't our course look like that?'" Zeh said.

Given these expectations, Zeh said the organization tries to ensure the course superintendents they work with are striving to use environmentally conscious methods.

Bellingham's Avocet Environmental testing center provides water quality testing for Semiahmoo Course. The testing detects the presence and amount of such chemicals as nitrogen and phosphorus. This is a good indication of chemical levels in groundwater and runoff, said Robert Mitchell of Western's geology department.

In November 1993, Semiahmoo became the first course in the state that the Audubon International certified for its sanctuary program. To qualify, Vance Much, superintendent at Semiahmoo, planted more than 500 native trees and let the "rough" areas of the course grow back to return 10 percent of the course to its natural state. Much, an Oregon State University graduate, said many of his classes focused on the environment in his horticulture program.

"I am an environmentalist, I love the outdoors, and I have kids, you know," he said. "Why would I want to put dangerous chemicals into the environment?"

Paxton and other environmental advocates are wondering just that.

Though golf courses raise many environmental concerns, ranging from water quality and availability to wildlife displacement, a new trend among many golf course superintendents is toward more sustainable and environmentally conscious methods. In an effort to eliminate the negative perceptions of golf courses, Much and other superintendents are seeking further education to manage their courses in ways that makes sense for both the environment and the game of golf.

Senior Andrew Joseph Morgan studies geography and English. He has been published in the Bellingham Weekly.

SWITCHING HANDS

by Kate Gould
photos by Taylor Williams

WHATCOM COUNTY DAIRY FARMS STRUGGLE WITH THE CHALLENGE OF DEALING WITH THE WASTE THEIR LIVESTOCK PRODUCE

With more than 55,000 dairy cows, Whatcom County is dealing with a waste-weight equivalent to the amount produced by 2.8 million people — more than Seattle, Spokane, San Francisco and Portland's human waste combined.

An average 1,500-pound cow produces its own body weight in manure every week. With more than 55,000 dairy cows, Whatcom County is dealing with a waste-weight equivalent to the amount produced by 2.8 million people — more than Seattle, Spokane, San Francisco and Portland's human waste combined.

Whatcom County ranks second in the state and 15th in the country in dairy production. An average 46 inches of annual rainfall flush manure from farmlands to ditches and then into rivers, which eventually empty into bays. Of all livestock operations, including pork, beef and poultry, dairy farm waste is of greatest concern, said Kirk Robinson, lead inspector of the Washington State Department of Agriculture's program to protect water from livestock nutrient discharges. This program, until 2002, answered to the Washington State Department of Ecology.

"Dairy farms deal with a liquid form of sewage, so it can be more of a problem with the water supply," Robinson said.

Poor management of this liquid waste, called slurry, can lead to environmentally damaging emissions of certain chemicals. Direct discharge of the waste into bodies of water can disrupt aquatic ecosystems by causing rapid growth in microorganisms, resulting in reduced oxygen levels.

Waste also can contribute fecal coliform bacteria to water bodies. Bacterial contamination has led to closures of numerous shellfish harvesting areas. For example, the Lummi Nation closed 60 acres of Portage Bay shellfish beds in 1996 because of high fecal coliform counts. The Lummi aquaculture industry consequently lost $250,000.

In 1997, the EPA responded to the Lummi Nation's concerns that animal waste was contaminating shellfish beds. The Lummi Natural Resources Department conducted EPA-funded studies and concluded that agricultural animal waste — specifically that from dairy farms — was the primary source of this contamination.

Dave Ragsdale, environmental engineer for EPA-led dairy inspections, said the EPA inspected 57 dairy farms in Whatcom County, finding that all but six of these farms displayed manure management practices that didn't adequately prevent spills into nearby water bodies. The EPA warned some farmers and fined others, depending on how poor their practices were.

"It was (this) event that occurred in Whatcom County that changed the whole state law," said Chuck Timblin, resource specialist at the Whatcom Conservation District.

MANURE MANAGEMENT

The federal Clean Water Act of 1972 prohibits concentrated animal feeding operations from allowing manure to discharge into surface and groundwater. But for 26 years, no state agency routinely monitored manure management practices in Washington.

In 1998, Washington passed the Dairy Nutrient Management Act, requiring dairy farms to store all their manure in lagoons for the winter rainy season. In the growing season, generally from June to May, farms are required to fertilize their fields at appropriate levels, accounting for soil absorbency and expected rainfall.

The act also authorized Ecology to begin an inspection program for all dairy farms in the state. But Ecology suggested ending the program in 2002 because of a lack of funding. Concerned dairy farmers met with EPA officials at the regional office in Seattle.

"The dairy industry felt we needed a stick out there to beat on the guy who wasn't playing by the rules," said Larry Stap, a Lynden dairy farmer.

The Washington State Dairy Federation lobbied the state Legislature to transfer the program from Ecology to the Department of Agriculture. In July 2003, Sens. Marilyn Rasmussen and Mark Schoesler sponsored the bill and the state Senate ratified it.

"When Ecology proposed cutting the dairy inspection program, it was a proposal," Ragsdale said. "The state dairy federation saw that as an opportunity to fund the Department of Agriculture rather than finding money in the state Legislature to fund that program."

When the program transferred to the Department of Agriculture in July 2003, the number of inspections decreased substantially, according to the Lummi NRD. Eight inspectors worked for Ecology, two of whom were hired specifically to oversee Whatcom County. The Department of Agriculture, however, hired one inspector in 2003 to oversee Whatcom, Skagit, Snohomish, Island, and northern King counties.

"We have only had this program

OPPOSITE PAGE: Jersey Cows stand and stare at passersby in a holding area where their excrement is flushed through a pipe to a waste lagoon.

RIGHT: Larry Stap, owner of Fishtrap Farms, points out over one of his two lagoons, which are holding ponds for cow waste

Kate Gould

Photo: Khale Wallitner

TOP:
A local beach closed to shellfish harvesting, most likely from the pollution of the nearby farms.
BOTTOM:
Jersey cows feeding in the barn at Stap's farm in Lynden.

for two years. I think all in all it's been successful," Robinson said. "It's a new program and it takes everybody a while to adjust to a new program."

Ragsdale agrees that the program could still be recovering from the transition of departments.

"The results have indicated that it hasn't been working," Ragsdale said. "But I hope they can get it to improve water quality."

Robinson said the majority of dairy farms in Whatcom County are in compliance with water quality regulations. During the past two and a half years of the Department of Agriculture inspections, only four out of 165 dairy farms in Whatcom County have leaked enough manure to warrant fines.

But according to the Lummi NRD, the transfer from Ecology to the Department of Agriculture — and subsequent budget and staff cuts — has greatly reduced the efficiency of the inspections.

DAIRY FARM IMPACT

"Instead of improving trends, fecal coliform counts have gone up and water quality is declining," Ragsdale said.

Although the Department of Agriculture agrees that fecal coliform counts in Portage Bay are elevated, it still disputes dairy farms' contribution. Ragsdale said he agrees that the analysis of dairy farm impact is inconclusive.

"One of the things I see in Whatcom County is a lot of growth," Ragsdale said. "Runoff associated with development is much more ubiquitous."

Partial and complete shellfish bed closures due to high fecal coliform counts in Portage Bay have affected approximately 200 tribal shellfish harvesters and their families since 1996, according to the Lummi NRD. Since that closure, government grants and other programs contributed more than $8 million to help the agricultural community improve its manure storage practices.

Lummi NRD officials urge for increased effort in dairy farm manure management and a role for the EPA in the state agriculture enforcement program.

Junior Kate Gould studies environmental studies. This is her first published piece.

OUTSIDE EFFECT

by Br

photos by Jared Yoakum

From outside, the house on East Lopez Court by Lakeway Drive, looks like a nice place to live, with a bay view in a high-income neighborhood. But inside, the stench and squalor of drug addiction reveals the lifestyle of the tenants who recently abandoned the estate.

This place was once a home, until the tenants converted it to an illicit methamphetamine lab. The property is now a mortal danger to its occupants, neighborhood and surrounding environment.

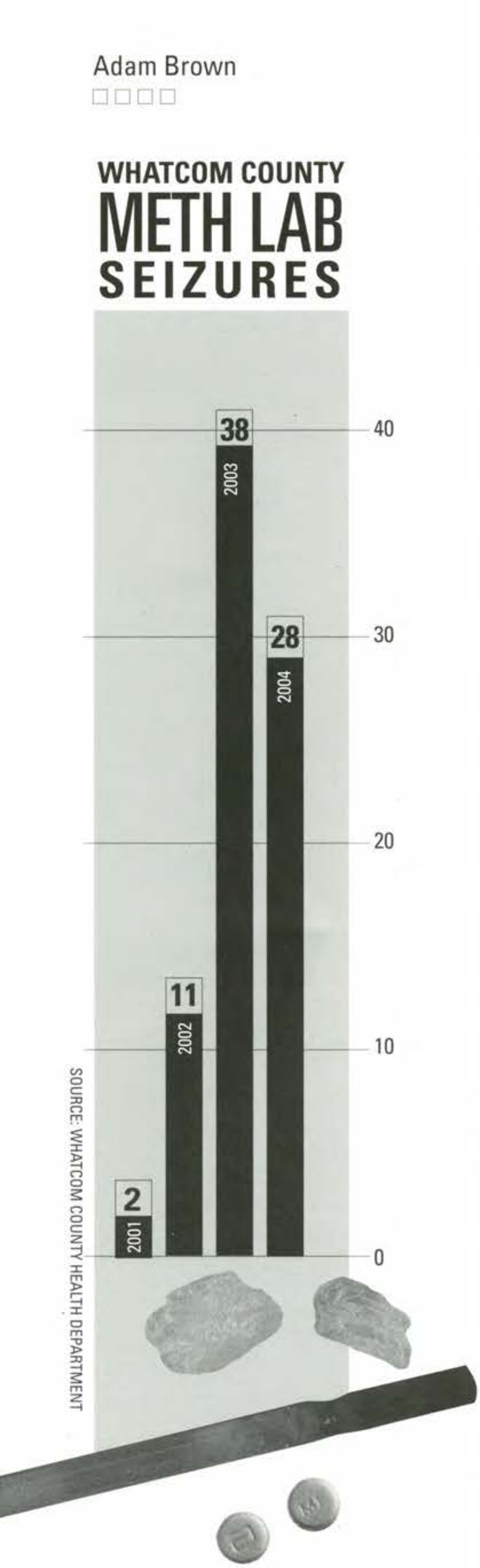
This house is one of dozens of meth labs in Whatcom County, said Jeff Hegedus, environmental health supervisor for the Whatcom County Health Department.

"They're out there," Hegedus said. "We discover one about every other week in Whatcom County."

Methamphetamine production is a chemical cocktail. Many of the ingredients are common household products — fingernail-polish remover, drain cleaner and pseudoephedrine, an over-the-counter decongestant. The byproduct of the process is extremely toxic.

The environment takes constant abuse from these labs because the concoction produces nearly 6 grams of toxic waste for every 1 gram of meth, according to

Adam Brown



Crime Institute, an anti-meth organization based in Kansas.

"It's worse (for the environment) in many ways than industry pollution because it is completely uncontrolled," said Richard Walker, supervisor of the Washington State Department of Ecology's Northwest region response team for meth labs. "Chemicals like anhydrous ammonia and hydrogen chloride are very dangerous. If they are kept in incompatible containers, there could be a cloud of toxic gas floating over the whole neighborhood."

When the toxic waste is dumped into a toilet or sewer, it ends up diluted in the bay, Hegedus said. If it enters the soil, the waste kills vegetation before soaking into the groundwater.

"The impact is significant, localized, and really depends on how much meth is being made," Hegedus said.

Dr. Susan Cook has felt the effects of secondhand meth herself. A toxicology consultant and former Huxley professor, Cook lived in Whatcom County on Squalicum Lake Road for much of the late '70s and the '80s.

While living next to a meth house, Cook, her mother and a few friends began to feel the negative health effects associated with meth poisoning. Their symptoms included dilated pupils, loss of bladder control and memory failure. Cook, who said she has never used an illegal drug, once blacked out while driving through an intersection and nearly hit a school bus.

"I knew something was wrong, but it wasn't until my horses got sick, too, that I started to suspect our water supply," Cook said.

Cook said she was convinced the meth lab up the road was contaminating the water in her well. After preliminary pH tests were inconclusive, Cook conducted further tests and found elevated levels of methyl mercury, which she calls a "tracer" to methamphetamine labs.

"If you see methyl mercury, you've probably got some meth in there," Cook said.

In the '60s and '70s, meth cooks used mercury in the cooking process. This is less common today, as red phosphorus is used instead.

After switching to bottled water, her symptoms soon faded.

Bill Angel, environmental health specialist for the health department, said the toxic byproduct would pollute any water it comes in contact with.

"If a big enough slug (of waste) came down, it would have a major effect," Angel said. "(Chemicals) occasionally slip by, I'm sure, but the treatment plants reduce the toxins significantly."

The volume of waste produced is the biggest environmental concern. The Department of Ecology once took 90 drums of toxic byproduct from a single meth site, Hegedus said. Ecology sends this byproduct through treatment facilities or stores it for testing. The problem is that many labs go undiscovered and continue to operate, their cooks haphazardly dumping the waste wherever they can.

Walker said he has seen the byproduct deposited in garbage cans, sinks, toilets, woods, marinas and city parks, on dead-end roads, and once even under a baby's crib.

"It's hard to imagine a meth addict who cares about the environment," Hegedus said. "They just go where it's easiest to dump."

Meth production has been focused largely in rural areas of Whatcom County because of the dangerous and illegal nature of the cooking process, Walker said.

Whatcom County spends between $12,000 and $15,000 to clean up a lab, Hegedus said. Any area where meth was cooked must be renovated completely because of the harmful residue left on interior surfaces. Washington state law requires property owners to clean former labs so no more than 0.1 micrograms of meth residue per 100 square centimeters remains, Hegedus said. Additionally, on July 12 Whatcom County Council passed an ordinance that forces land owners to submit a cleanup plan within 45 days of a lab bust and requires a complete decontamination of the property within 90 days.

"Meth is unlike any other drug I've seen in 32 years of law enforcement," said Whatcom County Sheriff Bill Elfo, who is also on the attorney general's Meth Task Force. "Aside from the risk of fire and explosion, these labs are an ecological disaster waiting to happen."

Senior Adam Brown studies communication. He has been published in the Western Front.

THE TRUE STORY OF A METH COOK

The stereotypical meth addict is frail, with sunken eyes and open sores on the face and arms. Missing teeth, twitching and scratching their way the next fix, the addicts care little about their own hygiene and personal welfare. While it is easy to dismiss these people as inhuman shells of their former selves, they are real people with real stories.

Joe Roe, who wants to remain anonymous because he served his time in prison and now wants nothing to do with his old habit, cooked, used and sold meth in Marysville from February 1999 to September 2001, when police and drug-enforcement officials raided his house. Police found 500 grams of methamphetamine, a loaded .38-caliber pistol and drug manufacturing equipment. Facing 15 years in prison, Roe plea-bargained and served 13 months, including six in a work-release facility on North Garden Street in Bellingham.

"I got shot doing one deal. The guy just opened the passenger door, shot me through the arm and then sped off."

Former meth user

"These chemicals are no joke," Roe said. He holds his two pinky fingers side by side, displaying a centimeter missing from the tip of his right finger from cooking a bad batch of meth — but that is not the only scar he received from his years cooking and dealing the drug.

"I got shot doing one deal," said Roe, 26. "The guy just opened the passenger door, shot me through the arm and then sped off."

Roe is calm and reflective as he describes his experiences with meth. He is thin but looks healthy. His phrases are well formed and his manner intelligent. Occasionally, he takes on a slightly thuggish, boisterous tone, seeming proud of his former manufacturing methods.

"It's real simple," Roe said. "It's not even a reaction; it's displacement. You're taking (pseudo)ephedrine from the store and taking away an oxygen molecule. You just need 50 different things to do it."

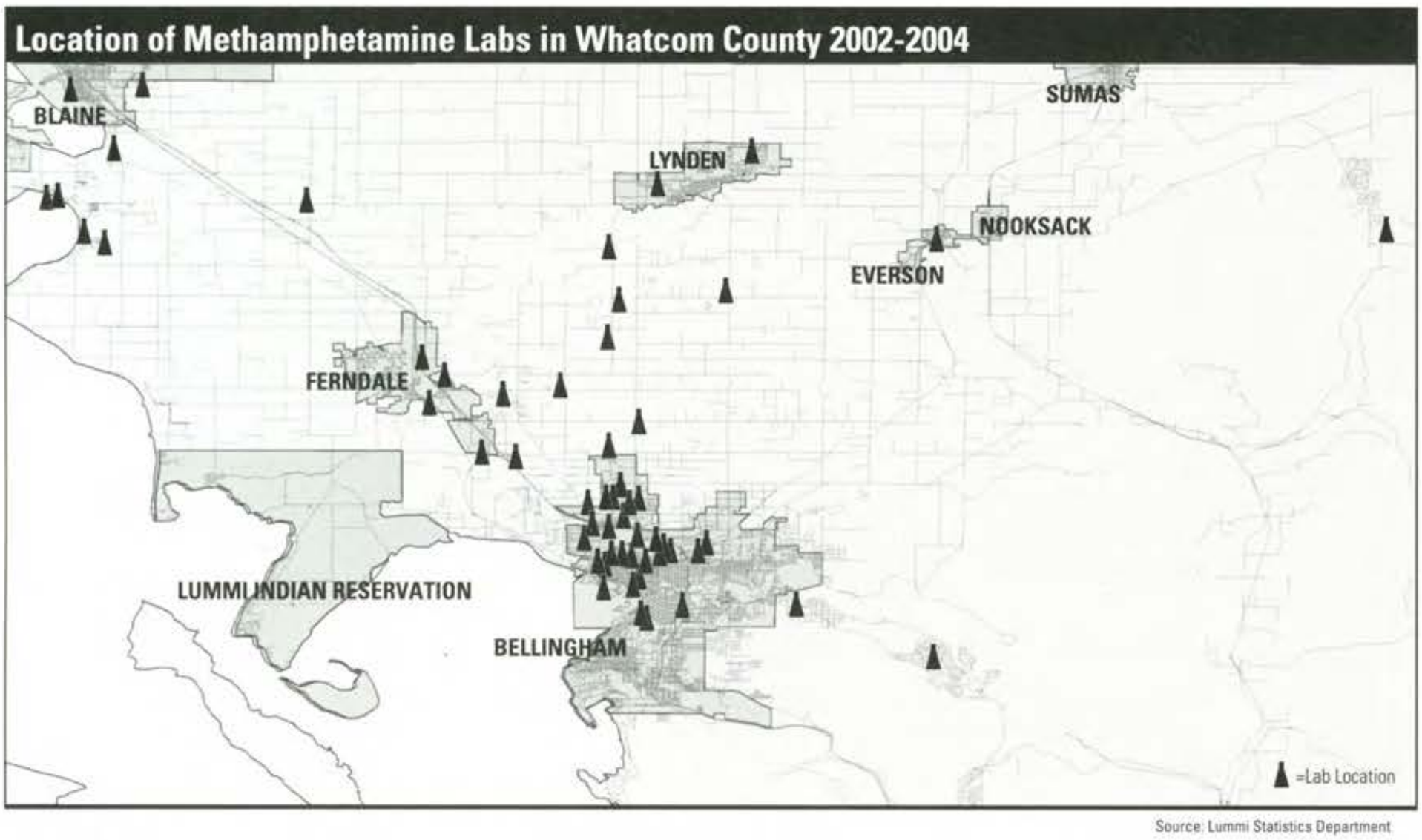
While Roe said he would never tell anyone his own personal recipe for the drug, commonly used reaction catalysts include solvents, phosphorus, iodine and metals, according to the Koch Crime Institute.

Roe, who sold up to 8 kilograms a week, recalled pouring his cans of toxic byproduct into forest embankments, streams and riverbeds. He said the substance would instantly destroy any wildlife it encountered — and nearly poisoned himself a few times.

"I remember walking out to the woods with the byproduct and the wind changed directions, and I caught a whiff," Roe said. "The whole world went white; I collapsed and didn't know if I would ever come back."

Roe works at a steak and burgers restaurant in Whatcom County. He has put his meth experience behind him and no longer cooks, uses or associates with methamphetamine.

"I didn't get blown up, so I did good," he said. "I'm lucky, but most of the people who cook meth are just plain stupid."



Source: Lummi Statistics Department

LEFT:
Map of discovered meth lab locations throughout Whatcom County.
INFORMATION REGARDING METHAMPHETAMINE LABS IN WHATCOM COUNTY
Between 2002 and 2004 there were a total of 77 methamphetamine labs found in Whatcom County: 11 labs in 2002, 38 labs in 2003 and 28 labs in 2004.

Adam Brown
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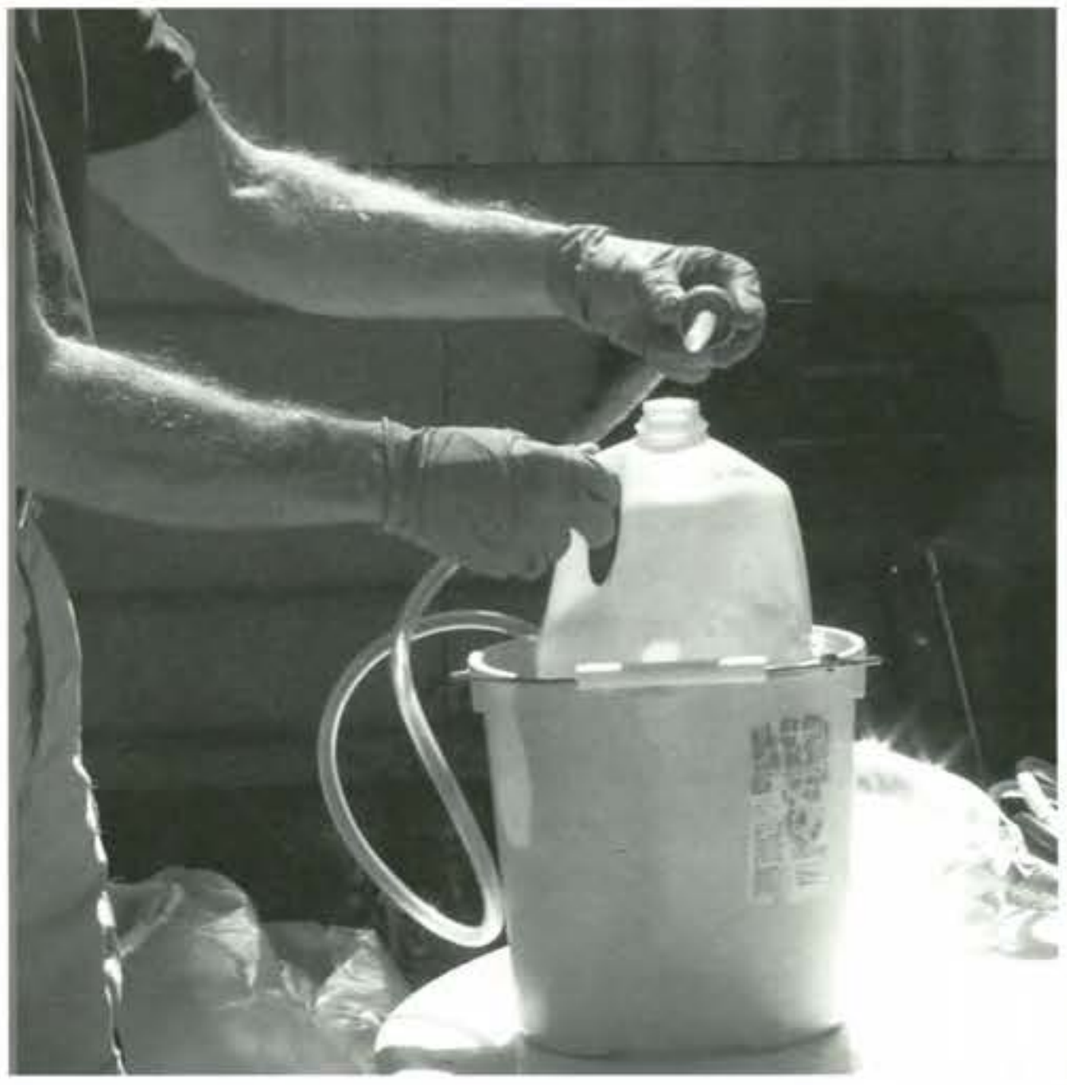

Photos Courtesy of the Washington State Patrol

HAZARDS of METHAMPHETAMINE PRODUCTION

LAB SITE CHEMICALS	LEGITIMATE USES	POISON	FLAM-MABLE	TOXIC VAPORS	EXPLOSIVE	CORROSIVE	SKIN ABSORPTION	HEALTH HAZARDS
ACETONE	Fingernail polish remover, solvents	☠	☠	☠			☠	Reproductive disorders
METHANOL	Brake cleaner fluid, fuel	☠	☠	☠			☠	Blindness, eye damage
AMMONIA	Disinfectants	☠		☠		☠	☠	Blistering, lung damage
BENZENE	Dye, varnishes, lacquers	☠	☠		☠	☠	☠	Carcinogen, leukemia
ETHER	Starters fluid, anesthetic	☠	☠		☠			Respiratory
FREON	Refrigerant, propellants	☠		☠		☠		Frostbite, lung damage
HYDRIODIC ACID	Driveway cleaner	☠		☠		☠	☠	Burns, thyroid damage
HYDROCHLROIC ACID (Hcl gas)	Iron ore processing, mining	☠		☠		☠	☠	Respiratory, liver damage
IODINE CRYSTALS	Antiseptic, catalyst	☠	☠		☠	☠		Birth defects, kidney failure
LITHIUM METAL	Lithium batteries	☠				☠	☠	Burns, pulmonary edema
MURIATIC ACID	Swimming pool cleaners	☠		☠		☠		Burns, toxic vapors
PHOSPHINE GAS	Pesticides	☠		☠			☠	Respiratory failure
PSEUDOEPHEDRINE	Cold medicines	☠						Abuse: Health damage
RED PHOSPHORUS	Matches, fireworks	☠	☠	☠	☠			Unstable, flammable
SODIUM HYDROXIDE	Drain cleaners, lye	☠		☠		☠	☠	Burns, skin ulcers
SULFURIC ACID	Battery acid	☠		☠		☠	☠	Burns, thyroid damage
TOLUENE	Paint thinners, solvents	☠	☠	☠	☠		☠	Fetal damage, pneumonia
LIQUID LAB WASTE	None	☠	☠	☠	☠	☠	☠	Unknown long term effects

Source: Washington State Department of Health Web site

TOP LEFT:
Garbage left behind from a meth lab in the 2500 block of Yew Street.

TOP RIGHT:
Washington State Patrol clean up the remains of a lab.

LEFT:
Diagram of chemicals used in a typical meth lab.

TOXIC COWBOY

by Jessica Knox

"Never, ever stand on top of an unearthed drum of chemicals," said Jeff Hegedus with a grave look in his eye and his left palm extended vertically in front of him. He then pointed to a picture of himself doing exactly that 20 years earlier.

Hegedus is the environmental health supervisor for the Whatcom County Health Department. The drum he spoke of in this case was one of dozens used to store phenol, a caustic solvent. He had to dig them up while cleaning up a hazardous waste site in Kent.

"I once heard about a man that was climbing around on the rusty lid of a drum, and it collapsed under his weight and his body was burned severely by the acid," Hegedus said. "Those were certainly the toxic cowboy days."

Hegedus said that prior to 1989, when Washington adopted the State Model Toxics Control Act, no regulations were in effect for cleaning up a toxic waste site. Hegedus and other environmental consultants had to learn through experience when clean was clean enough. Clear standards for the cleanup of hazardous waste sites were not set until the early '90s through the state act. Hegedus was working as a site hazard assessment specialist at the time. He also was one of the individuals who created Washington state's toxic cleanup regulations that now determine the permissible levels of chemicals in the ground. Through his multiple and varying positions in the environmental field, Hegedus has experienced a colorful existence thus far.

THE TOXIC COWBOY DAYS

In 1982, Hegedus graduated from Ohio State University with a bachelor's degree in chemical engineering. In 1985, he received a master's in operations research and statistics and an MBA in business management from Rensselaer Polytechnic Institute in New York. Hegedus never received an environmental degree — in the early '80s, he said, jobs related to toxic waste were not in high demand and in some cases didn't exist.

After graduate school, Hegedus worked for a telecommunications company for two years. He was the assistant to the vice president, moving throughout the country every six months, wearing $500 power suits, driving a Mazda RX-7.

"I was being groomed for corporate gold," Hegedus said. "I was essentially a yuppie."

After two years, he decided he wasn't a suit and wanted to do something more than be a marketing tool for a corporation. He told his vice president, "the success I had found at the telecommunications company was something I had settled for because I couldn't think of something noble enough worth fighting for." He sold the suits, sold the car and moved across the country to Washington to "clean up the world."

"I left a very lucrative business, moneywise, in order to sweat in a Tyvek suit in the sun and clean up toxic chemicals, but I was making a noble compromise abandoning money in order to serve my community," Hegedus said.

In the late '80s, Hegedus and two friends formed their own hazardous-waste brokerage, called Envirotech Systems Inc., in Seattle. He worked as a hazardous-waste broker, managing field operations in waste management. Envirotech would collect 55-gallon drums from companies that didn't know what to do with their chemical waste and package, label and transport that waste to a treatment facility.

"We would round up unlabeled or mislabeled drums, figure out what was inside and dispose of them as the Department of Ecology or the Environmental Protection Agency desired," he said.

No rules or regulations dictated their movements — Hegedus said Envirotech determined and created proper rules and regulations as they went.

It was during his time with Envirotech that Hegedus had a dangerous encounter with phenol, a highly poisonous solvent. He was working by himself, which is rare today; pouring 5-gallon buckets of used chemicals into 55-gallon drums that Envirotech transported to be treated. Someone at a business that manufactured rubber seats for exercise equipment had mislabeled one of the buckets; Hegedus ended up pouring a bucket of an isocyanate-based catalyst into 40 gallons of a rubber production byproduct resin, which caused an exothermic reaction and released hydrogen cyanide — the same product that killed more than 2,000 people and caused long-term harm to more than 200,000 when it escaped

Jessica Knox

"We live in this check-and-balance system of competing self interests, and it's important to recognize the value of everyone's role."

Jeff Hegedus

Photo: Jared Yoakum

from the Union Carbide plant in Bhopal, India, in 1984.

"I was suddenly tasting bitter almonds — and I'm a chemical engineer, I knew what that meant," Hegedus said.

A polymer, or a chemical compound comprising more than two chemicals, formed on top of the chemicals and sealed off all ventilation. The drum started to bulge and Hegedus had to jam a pipe down to vent pressure and keep the drum from exploding. It took more than 24 hours for the drum to cool down completely.

"I remember driving away feeling violated that afternoon. People almost lost their lives for rubber seats on exercise equipment," Hegedus said. "Rubber seats! Are those really necessary?"

From 1992 to 1996, Hegedus designed, constructed and operated a hazardous-waste collection and disposal facility for household and small-business chemical wastes for Skagit County Public Works in Mount Vernon.

"It wasn't abnormal to see semis lined up outside the facility loaded up with thousands of chemical-filled drums being shipped off for proper disposal," Hegedus said.

In 1998, Hegedus accepted a job in Ketchikan, Alaska, where he lived in a log cabin by the water and worked to clean up and demolish a hazardous waste site, much like the Port of Bellingham is planning to do with the old Georgia Pacific plant.

"I was making such good money on that project that it didn't even register as odd to me to be flying back and forth between Seattle and Ketchikan every other week," Hegedus said. "I was making an adventure out of my livelihood."

It was in Alaska that Hegedus bought his first sailboat. It also was there he met his future wife of three years.

"For our first date we went on a 30-day trip around the San Juan Islands and Gulf Islands, then we flew to Mexico for our second date. It was soon after that I proposed," Hegedus said.

Hegedus' experience in the environmental field has led him to his present position of two years as Whatcom County's environmental health supervisor. He works with site hazard assessment specialists to clean up hazardous waste spills and meth labs in Whatcom County according to MTCA regulations.

Sandi Hughes-McMillan, business service supervisor, has worked with Hegedus at the health department for a year. The staff she oversees, offers supervison and support for Hegedus' environmental health department program. She describes Hegedus' work ethic as "over the top."

"He sets high expectations for himself and his staff and expects things to get done — and done correctly," she said.

Hughes-McMillan depicts Hegedus as a charismatic individual who can put a framework around what he does and make people see the bigger picture, but also someone of whom she can ask questions outside a business context because he offers good life lessons.

"Jeff is certainly someone I would be comfortable stranded on an island with. He can add humor to any situation, and he's a talker! There wouldn't be any silence. We'd be figuring out the answers to all the world's problems," she said, laughing.

THE PHILOSOPHICAL ENVIRONMENTALIST

Hegedus' gold hardhat gleamed in the sun beating through the window as he discussed his recent promotion to chair of the Marina Advisory Committee. His promotion allows him to be involved in deciding what to do with the waterfront and all the land-use applications after the Geordia Pacific plant is demolished.

"I'll have the opportunity to take my philosophies and make something out of it in my own community," Hegedus said. "We live in this check-and-balance system of competing self interests, and it's important to recognize the value of everyone's role."

Hegedus explained that all parts are needed for change. The activists bring attention to the cause, the technicians provide objective facts and elected officials suggest legislation.

"We have got to respect the roles of all parts and stop getting angry and blaming," Hegedus said. "This is what democracy is."

Senior Jessica Knox studies education. She has been published in the Planet before.

PREVIOUS PAGE: Polaroid of Envirotech staff from the '80s.
BELOW: The Envirotech staff unearths buried drums of hazardous waste.

Photo Courtesy of Jeff Hegedus

OVERGROWN

Increasing Development Increases Pollution in the Lake Whatcom Watershed

by Willow Rudiger
photos by Bradley Thayer

In the Sudden Valley community, 200 houses are under construction.

"When I came to Sudden Valley 15 years ago, I was living in a forest. It was lovely. That's why everybody came there in the first place," said Roger Bull, chair of the Sudden Valley Community Association City Committee. "Most people who come immediately wish that no one else will come."

The 1,700-acre area is already home to approximately 2,400 houses. Zoning laws restrict the build-up capacity to 3,300 houses, and restrictive covenants and a density reduction plan have allowed 1,388 lots to be preserved. Still, at a rate of 200 to 250 houses being built each year, the association expects Sudden Valley to reach build-up capacity within the next five years.

Downed trees and displaced wildlife are visible signs of environmental degradation accompanying residential growth in the Lake Whatcom watershed. Exposed soil from construction and landscaping also accompanies new development, increasing phosphorous runoff into the lake.

Scientists and citizens of Whatcom County are expressing alarm concerning Sudden Valley's increasing residential development and its increasing contribution to pollution in the lake, which is the primary drinking source for approximately 85,000 residents.

"We continue to find that the highest levels of pollution come from the most heavily developed watersheds," said Richard Grout, director of the Washington State Department of Ecology Bellingham field office.

LEFT:
One of the more than 200 houses built in Sudden Valley each year.

ABOVE:
Roger Bull, chair of the Sudden Valley Community Association City Committee

Willow Rudiger

ley Community Association appealed to the Whatcom County Council and was granted status as an urban growth area, which qualified it for state funding and gave the lakeside community five years to become its own city. The association used state funding to construct the Lake Louise sewer line in 2003, allowing a wave of new development.

"While it is difficult to attribute the impact of any one activity in a complex system like Lake Whatcom, history tells us repeatedly that land development along the lake results in increased loading of certain compounds," said Peg Wendling, Bellingham Public Works Department supervisor.

A back hoe sits amidst a cleared site where construction on a new home is set to begin in Sudden Valley.

In 1999, the federal Clean Water Act listed Lake Whatcom as an impaired water body for lowered oxygen levels, and in 2004 it was listed again for containing high levels of contaminants such as mercury, polychlorinated biphenyls and dieldrin, a persistent chlorinated hydrocarbon insecticide that accumulates in and becomes toxic to vertebrates.

Researchers Christopher Berger and Scott Wells of Portland State University stated in a recent report that the eutrophication processes in the lake have accelerated in recent years because of the increased availability of nutrients from tributary discharges to the basin as a result of development.

"The study also shows that reducing fertilizer runoff, improving septic systems and targeting other nutrient sources will help slow degradation and, in the long run, reverse the dissolved oxygen problem," said Glenn Kuper, Ecology's Bellingham field office spokesman.

The Clean Water Alliance, a Bellingham advocacy group, filed a lawsuit at the beginning of this year challenging Sudden Valley's growth status. The group lost its appeal in Snohomish County court proceedings, but the case is now before the state Supreme Court for potential review.

The community wants to become a city to use the tax base for services such as security, road maintenance and possibly elementary schools, Bull said.

If a majority of voters grant the area city status on Election Day 2006, Sudden Valley will have 180 to 360 days to incorporate as a city in Whatcom County.

If Sudden Valley is granted city status, Whatcom County would be responsible for any future clean up of the lake.

As the debate concerning water rights versus property rights continues, many scientists, city and county council members, activists and private citizens worry about the impacts of development in and around the watershed.

April Markiewicz, of the Institute of Environmental Toxicology and Chemistry assistant director sits at her computer in an office lined with filing cabinets and thick notebooks containing various studies on issues affecting the environment of Whatcom County.

"Because we haven't identified all the chemicals entering into the lake, we don't know whether the ecosystem is actually being able to handle them," said Markiewicz, who is also the president of People for Lake Whatcom.

Markiewicz said that phosphorus associated with sediment loading is a principal concern because the phosphorus remains in the lake. The Public Works Department has had to increase the amount of chemicals used to treat water coming from Lake Whatcom while lowering its particle quality standards, Markiewicz said.

Scientific data revealing the direct effects of chemical pollution on Lake Whatcom from development does not exist, primarily because of shortfalls in funding.

The issues surrounding this fragile watershed are complex and difficult at best, and as the debate continues, it does not appear to be getting easier for anyone involved.

"The land where the houses are being built belongs to somebody, and legally they have the right to use it," Bull said. "You can require that they use it in a beneficial way by limiting the amount of ground that they can cover, which we do, and require certain standards for building."

Keeping Lake Whatcom a viable source of drinking water and the watershed a place to live requires compromise, Wendling said.

"The full impacts from increases in population in that area will be intricately dependent on land-use decisions and practices that are made there," Wendling said. "I don't believe that losing Lake Whatcom as a drinking water source is an option that is on the table for this community."

Junior Willow Rudiger studies environmental journalism. This is her first published piece.

WAYS TO HELP REDUCE CHEMICALS in RUNOFF

From theStorm Water Watcher Training Program's watershed pledge

1. Use an electric lawnmower
2. Leave clipping on grass as fertilizer
3. Wash cars on lawn or gravel
4. Hand pull weeds
5. Use alternative transportation
6. Reduce lawn size and allow native plants to grow
7. Leave fallen trees and branches in streams
8. Use natural fertilizer
9. Recycle motor oil
10. Never dump waste in storm drains or ditches
11. Inspect septic tank yearly and pump every three to five years

RESOURCES

WANT TO LEARN MORE?

This page is a meant to be a starting point for those who desire more information. Our reporters and editors contributed ideas on how to find out more. Also included are resources from Trade Secrets' Web site. Trade Secrets is a Bill Moyers' documentary concerning the hidden truths about chemical companies.

Toxic Waste

EPA Superfund Site Information:

http://www.epa.gov/superfund/sites

Information on specific toxic waste sites

EPA Toxic Release Inventory:

http://www.epa.gov/tri/

The EPA requires manufactures to report which toxic chemicals they are releasing into the environment. A searchable database can be accessed by selecting the "TRIS Queries" link on the TRIS home page.

Environmental Defense Scorecard Pollution Locator:

www.scorecard.org/env-releases/us-map.tcl

Plots pollution releases on local, state and national maps with concise explanations

Right-to-Know Net:

http://www.rtknet.org/tri/

Easy-to-use search engine finds information by geographic area, facility, industry, parent company or off-site waste transfers.

The Environmental Systems Research Institute:

maps.esri.com/ESRI/mapobjects/toxicweb/toxic.htm

This site provides a user-friendly way to search for Toxic Release Inventory information pinpointing contaminant releases on street maps so users can see how close they live to pollution sources

More about Meth

Koch Crime Institute:

http://www.kci.org

Methamphetamine discussion forum, chat room, meth information, recovery information and current headlines

Mfiles:

The meth and marijuana resource tool:

http://www.mfiles.org

Links to local and national news, health department publications and resources for taking action

Natural Resources

EPA Office of Groundwater and Drinking Water:

http://www.epa.gov/safewater/

Allows searches for contaminants in individual water system

Drinking Water Contaminants:

http://www.epa.gov/enviro/html/sdwis/water_contaminants.html

EPA site lists the major water contaminants and potential health effects

EPA Fish Advisories:

http://www.epa.gov/ost/fish/

Shows which states have issued warnings to limit or avoid consumption of certain types of fish or fish caught in specific lakes or rivers because of chemical contamination

EPA's Index to Airborne Toxic Chemicals:

http://www.epa.gov/ttn/atw/index.html

Health effects notebooks of hazardous chemicals. Search by name or select chemicals from a list.

National Pesticide Telecommunications Network:

http://npic.orst.edu/

Operated jointly by Oregon State University and the EPA. Search chemicals by category.

ExToxNet: The Extension Toxicology Network:

http://pmep.cce.cornell.edu/profiles/extoxnet/index.html

A Pesticide Information Project of Cooperative Extension Offices of Cornell University, Michigan State University, Oregon State University, and the University of California at Davis